

SURGICAL OPERATIONS

The background of the cover is a photograph of a surgical team in an operating room. Several surgeons in blue scrubs and masks are focused on a patient. Overlaid on this image are several green, semi-transparent anatomical diagrams. These include a cross-section of a human head showing internal structures, a diagram of a human torso with internal organs, and a detailed view of a hand or foot. The overall color scheme is dominated by teal and blue tones.

Dr. MOHAMMED EL-MATARY

MATARY
SURGERY

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Dedication

*Allah the all merciful, I beg Thee
To accept this effort
For the soul of my mother
She was your gift for me*

Acknowledgement

The author wishes to acknowledge with gratitude:

Dr. Said Abdel-Baky,

Professor of Surgery - Ain Shams University

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Preface

This book provides an update for medical students who need to keep abreast of recent developments. I hope also it will be useful for those preparing for postgraduate examination.

This book is designed to provide a concise summary of surgical operations, which medical students and others can use as study guide by itself or with readings in current textbooks, monographs, and reviews.

Summaries of relevant anatomical considerations are included in every chapter, taking into account that this book is written primarily for those who have some knowledge of anatomy, physiology, biochemistry and pharmacology.

The author is extremely grateful to all the contributors for the high standard of the new chapters, and hopes that you, the reader, will enjoy going through these pages as much as he had.

M. El-Matary

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General Principles of Surgical Operations

Types of suture materials

I- Absorbable sutures:

A. Natural:

1. Plain catgut:

- From the submucosal collagen of the sheep's intestine.
- Time of absorption: one week. (absorbed by phagocytosis)
- Uses: Its use is limited now because of severe reactions.

2. Chromic catgut:

- Like plain catgut, but it is modified by chromium salt solution to make it less irritant and to increase time of absorption to 3 weeks.

B. Synthetic:

1. Dexon (polyglycolic acid):

- Multifilamentous with good tensile strength,
- Time of absorption: 4 months.

2. PDS (Polydioxanone synthetic smooth suture):

- It is monofilamentous, so it is useful in suturing infected or contaminated wounds
- Time of absorption: 6 months.

3. Vicryl (polyglactin):

- It is multifilamentous.
- Time of absorption: after 4 months.
- Used now: for gastrointestinal anastomosis.

4. Monocryl polyglecapron 25:

- Monofilament with high tensile strength.
- Time of absorption: 3-4 months.

II- Non absorbable sutures:

A. Natural:

Surgical silk:

- It is multifilamentous.
- Rich in protein material so it causes marked tissue reaction.
- If infection occurs, we remove sutures to allow improvement.

B. Synthetic:

1. Nylon (Ethilon):

- It is polyamide.
- Mono- or multifilamentous with good tensile strength.

2. Prolene (Polypropylene):

- Monofilamentous with good tensile strength
- But: it has difficult knotting.

3. Polytetrafluoroethylene (PTFE):

- Minimal tissue response with good handling.

4. Recently

- Stapler.
- Adhesive tapes.
- Stainless steel

NB:**1. monofilaments sutures:**

Made up of single strand, less harbouring of organisms, well suite for vascular surgery

2. multifilament sutures:

made up of several filaments as strand , greater tensile strength

3. tensile strength:

Is the strength, which is required to hold the tissues in proper Apposition

TYPES OF STITCHES

(Refer to CD videos)

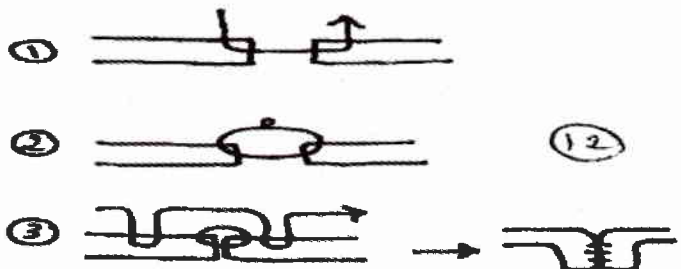
A. Interrupted:

1. Simple.
2. Mattress:
 - a. Vertical mattress.
 - b. Transverse (Horizontal) mattress.

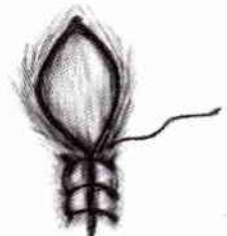
3. Lembert' suture:

It is the 2nd row of sutures:

- a- The 1st is all through
- b- The 2nd is the inverting sutures

**4. Tension suture.****B. Continuous:**

1. Simple overhead.
2. Blanket suture.
3. Quitted suture.
4. Lembert's suture.
5. Connell's suture. (loop on mucosa).



Suture removal

When

- It should be removed within 1-2 weeks depending on anatomical location
 1. Face → 5-7 days
 2. Scalp → 10 days
 3. Trunk & upper extremities → 10-14 days
 4. Lower extremities → 14-21 days

- Prompt removal reduce the risk of
 - suture marks
 - infection
 - tissue reaction

How

- Skin should be cleaned & sterilized
- Suture is gently elevated with forceps
- one side is cut
- then grasping by the knot then pulled towards the suture line

Alternative methods of wound closure

1. Steri- Strips
2. Staplers
3. Tissue adhesive
4. Barbed sutures

Types of Suture Needles
A. According to the shape of the needle:

(1) **Straight:** it is used in superficial structures e.g. skin.

(2) **Curved:** either $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$ of a circle.

**B. According to the cross section of the needle**

(1) **Rounded needle:**

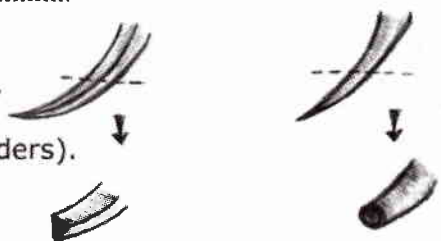
Its cross section is circular

Used for organs, mucosa and intestines.

(2) **Cutting needle:**

Its cross section is triangular (Sharp borders).

Used for sutures in the skin.

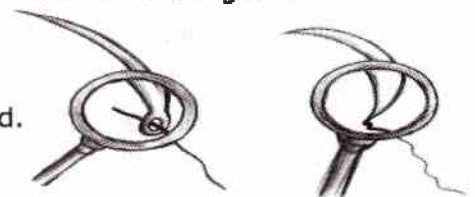
**C. According to the threading:**

(1) **Eyeless :**

- The thread is incorporated within the needle
- So the needle can not be threaded.
- Used in plastic, vascular, neuro-surgery, intestine and organs.

(2) **Eyed needle:**

- There is a small opening (eye) in the needle,
- So, it can be threaded and reused. Its use is limited.



STERILIZATION AND DISINFECTION

Sterilization:

- The complete destruction or removal of all forms of living micro-organisms (whether pathogenic or non-pathogenic).

Disinfection:

- Destruction of pathogenic forms of micro-organisms. Disinfectants are chemical substances that are usually toxic or irritant to the living tissues.

Antiseptics:

- Chemical substances which are less irritant or less toxic than the disinfectants and can be applied on the living tissues to destroy pathogenic forms of microorganisms.

METHODS OF STERILIZATION AND DISINFECTION:

- a- Chemical methods (disinfectants).
- b- Physical methods
 - Heat
 - Dry. - Moist.
 - Irradiation.
 - Filtration.

A- Physical Methods

A) Dry Heat

- 1) Incineration : destruction of contaminated materials by burning,
- 2) Direct flame.
- 3) Hot air oven.
- 4) Infra-red radiation

B) Moist Heat

Moist heat above 100°C: e.g. autoclaving (steaming under pressure).

	Moist Heat	Dry Heat
Mechanism of killing	Denaturation & coagulation of enzymes & proteins	Oxidation of essential cell constituents
Effective Temperature	Low(63, 100, 121°C)	High (160 °C or more)
Holding period	Short(15-18 min)	Long (1-2 hours)
Penetration	Yes	No (hot air is not)
Latent heat of steam	Yes	No
Sterilized objects	wet	dry

C) Irradiation

1. Ionizing radiations: (e.g. gamma and beta rays)

- Emitted from radioactive isotope (e.g. cobalt 60).
- Used for sterilization of materials which are damaged by heat, e.g. plastic syringes, rubber gloves, etc.

2. Ultraviolet rays:

- Have low penetration power.
- Used in surgical rooms and drug factories.
- Reduce the number of bacteria in air.

D) Filtration

- Used to sterilize fluids which are damaged by heat e.g, serum, plasma, vitamins, etc.
- Millipore filters made of synthetic membranes (cellulose) are available in different pore sizes.

B- CHEMICAL DISINFECTANTS

Group	Brand
ALCOHOLS	70% Ethyl Alcohol (100% Alcohols cannot penetrate cell membrane)
ALDEHYDES: Formaldehyde Glutaraldehyde	Formalin Cidex
HALOGENKS: Hypochlorite Hypobromite Iodine Povidone Iodine	Chlorox Vim Betadine
Colored Phenolic	Phenique
Quaternary Ammonium Compounds (Q.A.Cs): Cetrimide	Cetavlon
HYDROGEN PEROXIDE	

Ref.→ Belly & Love p.135

General scheme

1- Indications:**2- Contraindications:****3- Preoperative preparation:****4- Anesthesia:** usually general, may be spinal in lower half of body.**5- Steps:**

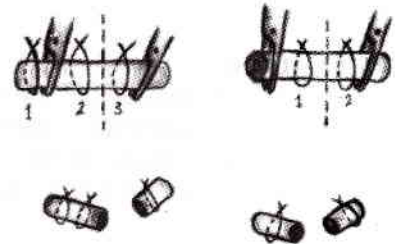
1. Position.
2. Skin preparation.
3. Incision.
4. Procedure.
5. Closure.
6. Post operative care.

6- Complications:**1. Hge:****1ry:**

- Due to injury of a blood vessel.
- During the operation.
- Controlled by pack for 4 min till VC.

Hold the vessel with Artery forceps → ligate it:

- artery with 3 ligatures & cut between the 2 & 3.
- vein with 2 ligatures & cut between them.

**2ry:**

- Due to wound infection.
- After few days of the operation.
- It needs pack & IV antibiotics.

No sutures as:

- Edematous friable tissue.
- Proteolytic enzymes → lysis of the sutures.
- The bacteria eat the nutrition of the tissues).

Reactionary:

- Due to slipped ligature due to hypertension or loose sutures.
- In the first 24 hr post operative.
- Patient is re-explored & the bleeder is controlled.

(NB: Blood transfusion may be needed in all these types of hge)

2. Wound complications:**a) Wound infection:**

- If within 3days → room operating room or tools.
- If in 5-7days → from the wards.

Treatment:

- Open stitches, take smear → culture & sensitivity.
- Leave the wound open & give Ab accordingly.
- Healing with 2ry intention in 2 months → ugly scar or with delayed 1ry closure instead → better.

b) Keloid

3. **Injury of imp. Structures:** → According to each operation.

4. Abdominal Operation complications:

- **Chest:** chest infection, atelectasis.
- **LL:** DVT.
- **Abdomen:** paralytic ileus, gastric dilatation & burst abdomen.

Subtotal Thyroidectomy

I-Indications:

- 1- Toxic multinodular goitre.
- 2- Simple multinodular goitre in:

- Large goitre with pressure manifestations.
- Cosmetic disfigurement.
- Malignant changes.

- 3- Toxic solitary nodule.
- 4- Retrosternal goitre.
- 5- Malignant goitre (Total or near total)
- 6- Graves'.

- After failure of medical Treatment.
- Large goitre with pressure manifestations.
- Socio-economic cause.

II-Preoperative preparation:

- If toxic: → medical preparation (must be euthyroid).
- If exophthalmos: exophthalmos static measures for 6 months.
- Thyroid antibody titre, in thyroiditis.
- Blood for Thyrotoxicosis.
- Chest X-Ray for retrosternal extension.
- Valium at night of operation.
- Indirect laryngoscopy (detects silent RLN palsy)
- for medico-legal purpose.

- Morphine & hyoscine.

(Instead of atropine in toxic cases as atropine causes tachycardia).

IV-Steps:

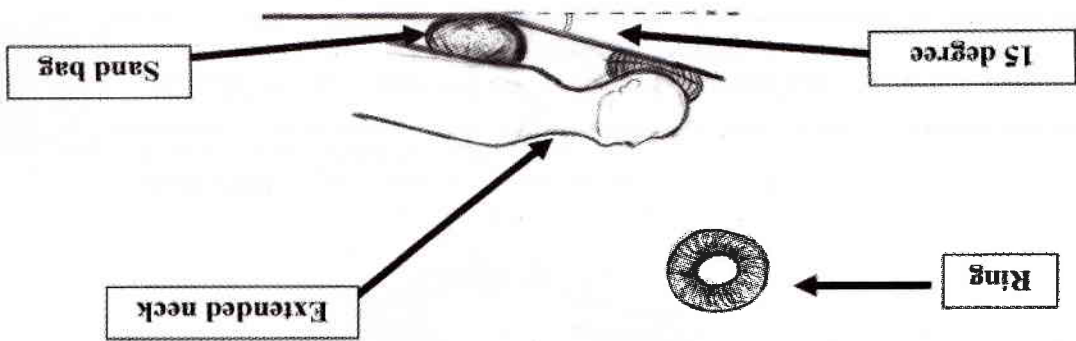
Position: Of the patient:

- ☞ supine
- ☞ shoulder supported on a sand bag to extend neck
- ☞ head on a ring to prevent side displacement

Of the table: → Head tilt up 15° to ↓ venous engorgement.

Adverse effect → Increases incidence of air embolism if a large vein is injured

Of the surgeon: → on the side opposite the lobe to be operated on.



Incision:

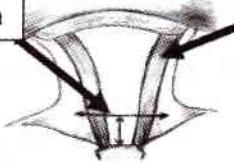
Mark the incision first with silk ligature.

Site:

- **Collar (Kocher's) incision** = 2 cm above the suprasternal notch, it extends to the posterior border of each sternomastoid.

2 cm above
sternal notch

Post. border
of
sternomastoid

**NB.**

1. *In large goiter, it can be extended to external jugular vein.*
2. *If the incision is done on the sternal notch, the skin of the hyperextended neck will be displaced downwards over the manubrium which will lead to keloid formation.*

Layers:

- Incise the skin then the superficial fascia with platysma as the blood vessels to the skin pass through platysma



N.B. The platysma has to be closed with the SC tissue as a separate layer to avoid adherent ugly scar.

Procedure:**a-Elevate flaps of skin & platysma:**

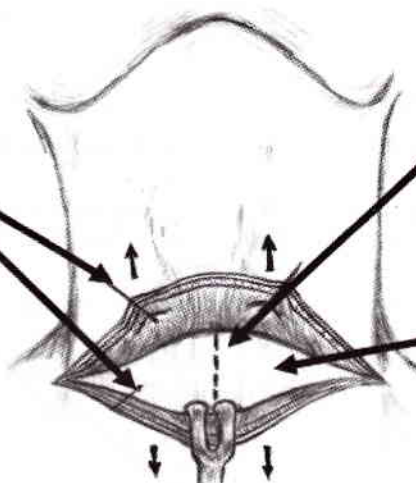
- Superiorly to thyroid cartilage.
- Inferiorly to suprasternal notch.
- flaps are kept in position via :cecil-jule thyroid retractor or 3 silk sutures fixed to the towel.

Ramy rizk

Retraction flaps of
skin & platysma

Longitudinally divide the
deep fascia in midline

Deep cervical fascia

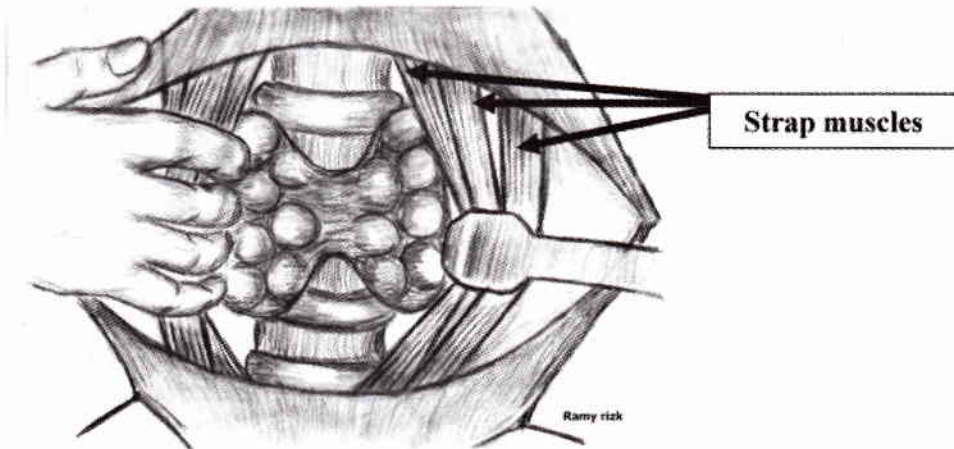


b-Divide the investing layer, pre-tracheal fascia longitudinally in midline.

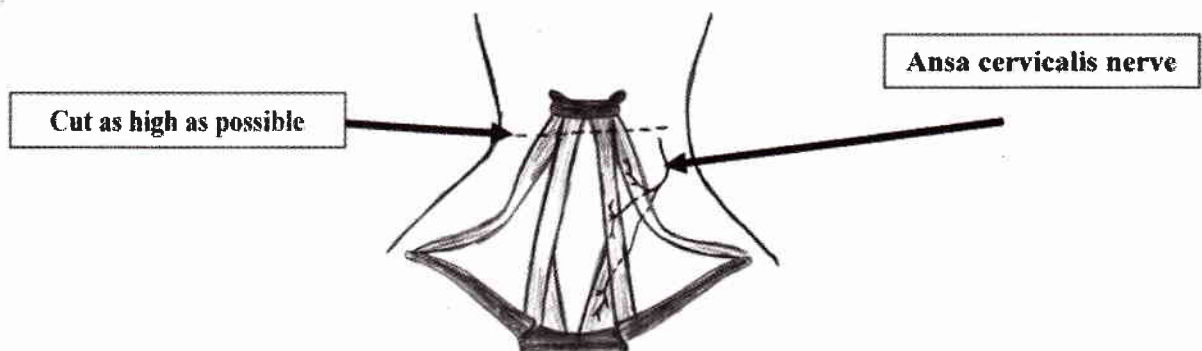


N.B. Midline is known by notch of thyroid cartilage & white line (Median raphe)

c-Separate the strap muscles & **reflect** them laterally.



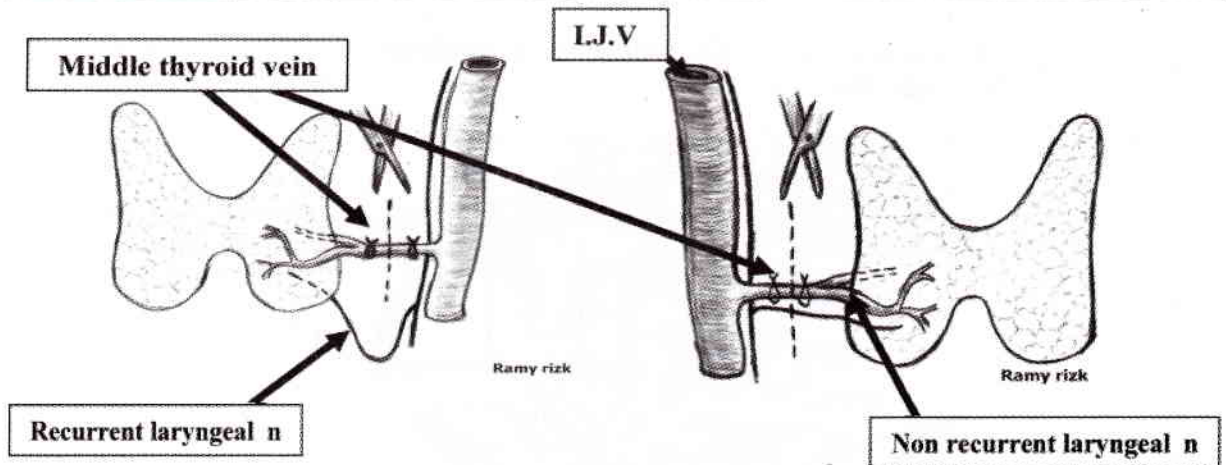
N.B. If necessary to divide the ms (in large goiter) → divide them as high as possible to preserve their nerve supply (ansa Cervicalis) which enters the lower part of the muscles.



d- Ligate & divide:

1) The middle thyroid vein:

- It is the **shortest** so it is the 1st to be ligated.
- **In 2% of cases** Rt. recurrent laryngeal n. may be non recurrent & therefore it may be injured during ligation of this vein.
- Nearer to the lower part of the gland.
- It may be absent, may be more than one.

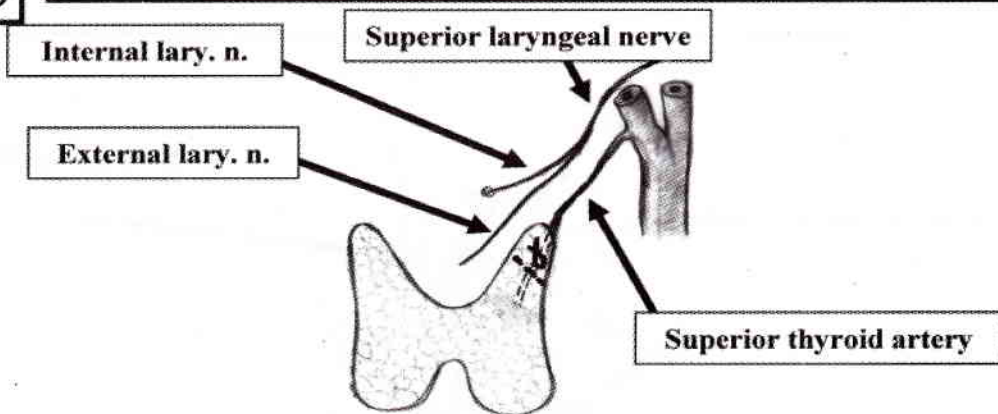


2) Superior thyroid artery & vein:

- At the **upper pole** of the gland
- **As close as possible** to the gland (& from medial to lateral)
- To avoid injury of **External laryngeal nerve**.



N.B. Injury to external laryngeal n. leads to paralysis of cricothyroid m.
→ loss of high pitched voice = (voice fatigue).



3) Inferior thyroid artery: (in toxic goitre)

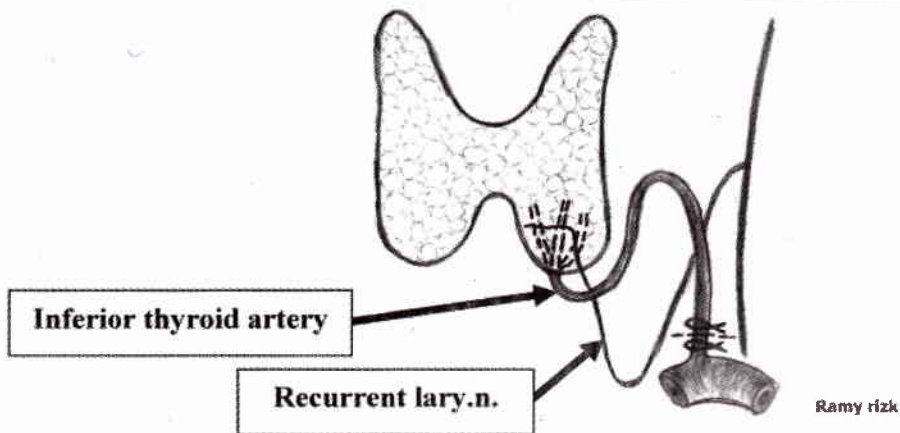
- At the lower pole of the gland.
- **Away** from the gland (behind carotid sheath).
- To **avoid** injury of recurrent laryngeal n.
- It is **ligated in continuity** to avoid fall of proximal stump in chest (necessitates thoracotomy if slipped ligature occurs).



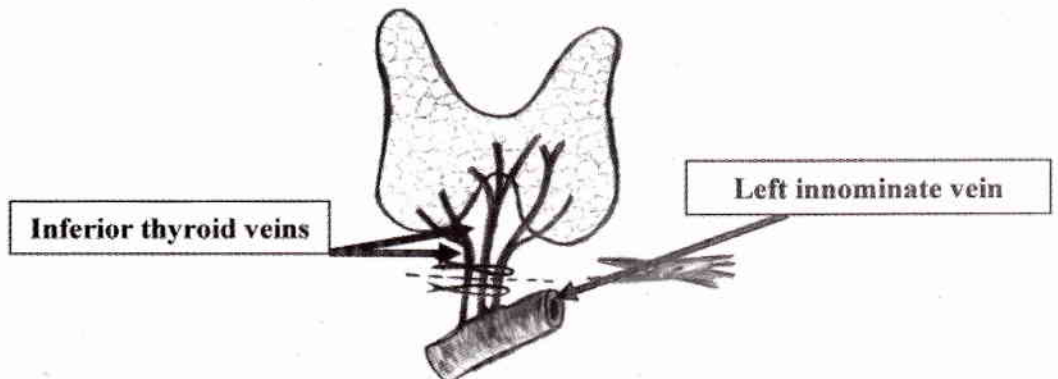
N.B. Some surgeons prefers to expose RLN within branches of inferior thyroid artery (i.e. near the gland) to avoid injury of blood supply of parathyroid gland.



N.B. Nowadays, the use of nerve stimulators is helpful in identifying the R.L.N. from the Inferior thyroid artery.



4) **Inferior thyroid veins (3-5):** → at lower pole



N.B. Artery is ligated before vein to avoid lobe congestion.

e- Delivery of thyroid lobe:

By blunt (finger) dissection from deep surface of pretracheal fascia & strap muscles.

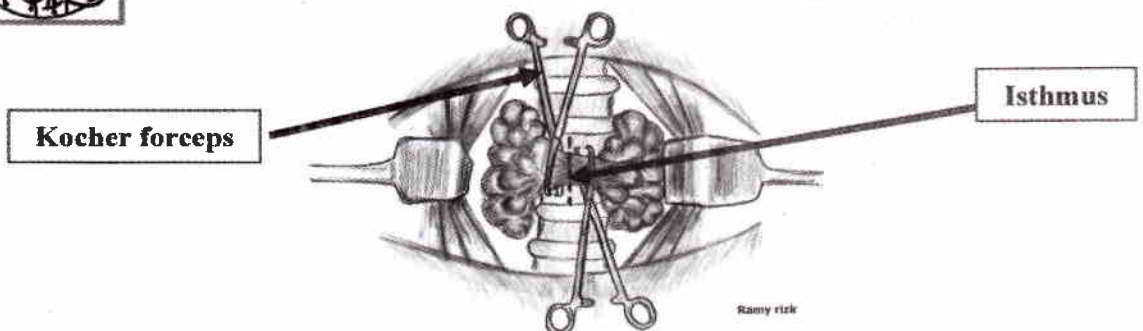
f-Exposure & devascularization of other lobe.

g-Divide the isthmus between 2 Kocher's forceps,

→ This causes barring of the trachea & relief of the pressure



N.B. Retrosternal extension is delivered by finger (sternotomy is rarely done).



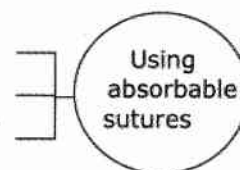
h-Place hemostats around margins of resection → leaving posteromedial portion (to protect the RLN & parathyroid glands).

Part to be left:

- In partial thyroidectomy we leave part equal to normal lobe.
- In subtotal thyroidectomy we leave part less than normal lobe:
 - In simple goiter part less than 1 cm (Or equal to the size of patient's thumb phalanx).
 - In toxic goiter part less than 1/2 cm.
 - Isthmus is removed in all operations why?
 1. Recurrent disease will give unsightly pretracheal lump.
 2. Facilitates access to the trachea if respiratory obstruction occurred.

Closure:

- Continuous suture to avoid haemorrhage from accessory tracheal & esophageal branches entering at ligament of Berry.
- Absolute hemostasis.
- Subfascial + SC suction drain.
- Close:
 - Pretracheal fascia at the midline.
 - Pretracheal muscles (if cut).
 - Subcutaneous tissue including the platysma.
 - Skin using:
 - a. Interrupted silk.
 - b. Subcuticular.
- Check vocal cords on extubation by direct laryngoscope.



Post operative care:

- Patient in semi-sitting position.
- Care of respiration.
- Remove drains after 24 hrs.

V- Complications:

1- Reactionary hge:

- Due to slipped ligature from thyroid vessels, stump, flap vessels, etc.
- With risk of suffocation due to mechanical compression on trachea & compression of venous drainage causing laryngeal edema.
- Open the wound at bed side if necessary.
- Return the pt to operating room for haemostasis.



N.B. Pain causes spasm of the muscles this cause more spasm of the trachea

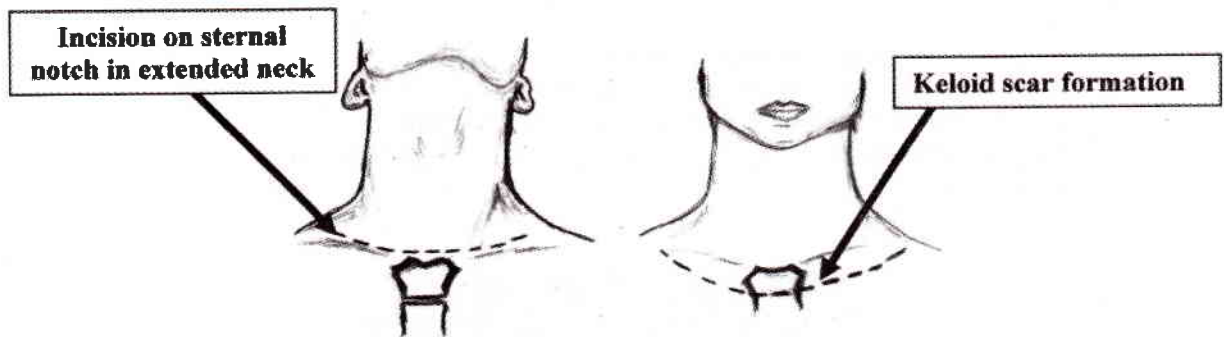
2- Injury of important structures:

- **Nerves:**
 - **External Laryngeal Nerve:** Cricothyroid muscle paralysis → Loss of high-pitched sound.
 - **Internal Laryngeal Nerve:** Chocking.
 - **Recurrent Laryngeal Nerve:** See thyroid gland (General Part I).
- **Thyroid:** → Hyperthyroidism or Hypothyroidism (according to the amount of the removed part).
- **Internal Jugular Vein:** → Air embolism.

- Trachea: → sutured by prolene (non-absorbable) as cartilage doesn't heal.
- Parathyroid: → Hypoparathyroidism.
 - Permanent:
 - Removal of the glands.
 - Temporary: from.
 - The stitches.
 - Use of cautery.
 - Bilateral ligation of inferior thyroid artery.

3- Keloid scar:

- Acute → Red in color.
- Chronic → Ugly scar.



4-Tetany:

- In first 3 days → bone hunger (corrected toxicity).
- After 1 week → hypoparathyroidism.
- C/P:
 - Latent tetany → Circumoral numbness (Earliest).
→ Trousseau's sign.
→ Chvostek's sign.
 - Manifest tetany: → Carpopedal spasm (Obstetric hand).
- III:
 - Acute attack: → Calcium chloride I.V. (10 ml).
 - Later → Vit.D (1-Alpha) + Calcium supplements.

5- Thyroid crisis: if poor preparation.

6- Resp. obstruction:

- Hge.
- bilateral vocal cord injury.
- Intraoperative aspiration due to full stomach.
- Laryngeal edema.
- Injury to trachea.

7- Recurrent thyrotoxicosis:

8- Wound infection:

► References:

- B. & L. p.776.
- McIver, Giuffrida, Goellner, J.R. (2001)/028-34.
- Mazza Ferri (93), England Journal of Medicine 328:55-9.
- Kuma, Matsuzuka, World Journal of Surgery 16:583-7

possible oral questions

1-what is the difference between unilateral lobectomy ,partial thyroidectomy ,subtotal thyroidectomy,near total thyroidectomy ,total thyroidectomy ,and what are indications of each?

2-kocher in surgery???(2 incisions,reduction of shoulder dislocation,forceps)

3-complications of simple nodular goiter??

4- ttt of thyrotoxicosis???

5-When and where we cut the strap muscles?

6-Clinical manifestations and management of thyroid crisis?

7-causes of postoperative dyspnea??

8-causes of postoperative change of voice?

9-manifestation and ttt of hypoparathyroidism???

10-management of postoperative progressive exophthalmos??

Sistrunk Operation**I- Indications:**

- Thyroglossal cyst.
- Thyroglossal fistula.

II- Steps:

- Transverse elliptical incision around the fistula or the cyst.
- Dissect the thyroglossal tract upto the tongue.
- Remove the central part of hyoid bone & a part of the base of floor of the tongue just below foramen cecum.

III- Complications:

- Recurrent cysts or fistulas:
 - due to incomplete removal of the thyroglossal tract.

Breast Operations

Simple Mastectomy

I- Indications:

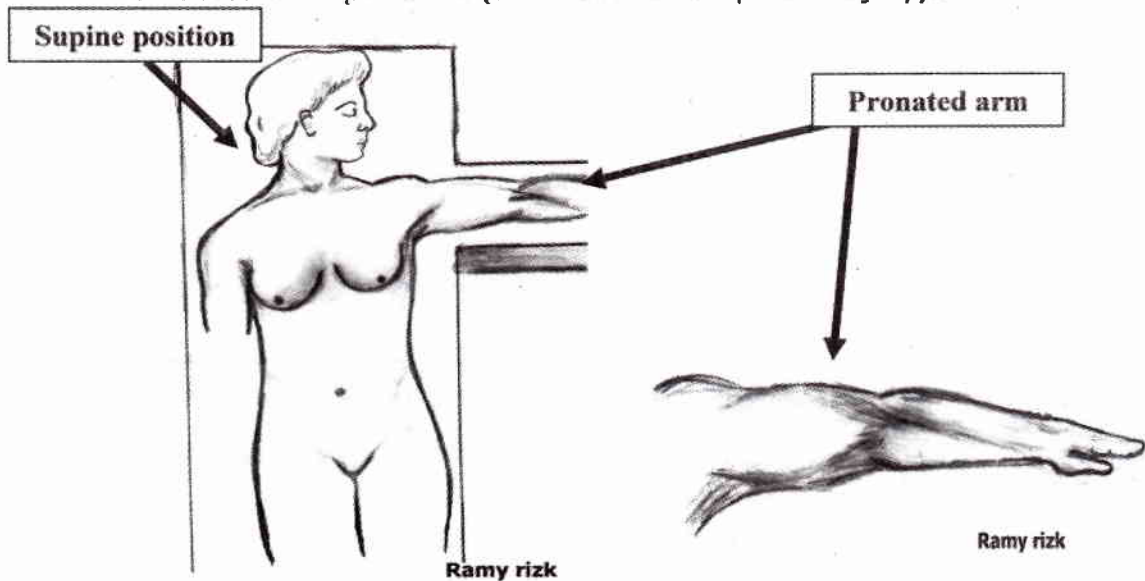
- 1) Stage III & IV Cancer Breast.
- 2) Acute mastitis Carcinomatosis.
- 3) Cystosarcoma phylloides.

III- Anesthesia: → GA

IV- Steps:

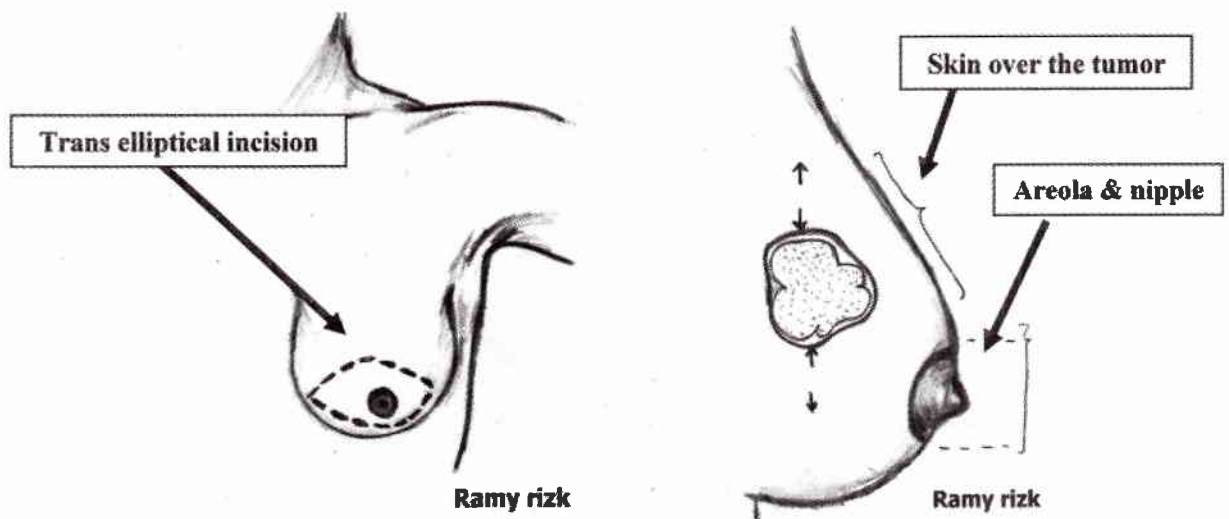
Position:

1. Body → supine.
2. Arm → extended & abducted (90°) on an arm board.
3. Forearm → pronated (to avoid brachial plexus injury).



Incision:

- **Transverse elliptical incision**

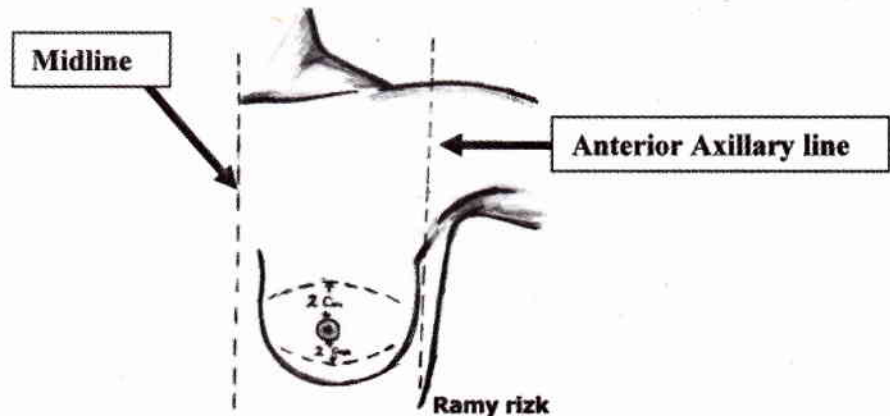


- ***It includes***

- The skin over the tumor.
- The nipple & areola.
(as it has the same lymph drainage of breast tissue).

- ***it extends***

- At least 2 cm above & below the nipple.
- From the midline (med) to ant. axillary line (lat.).



Procedure:

1) Elevate the upper & lower skin flaps

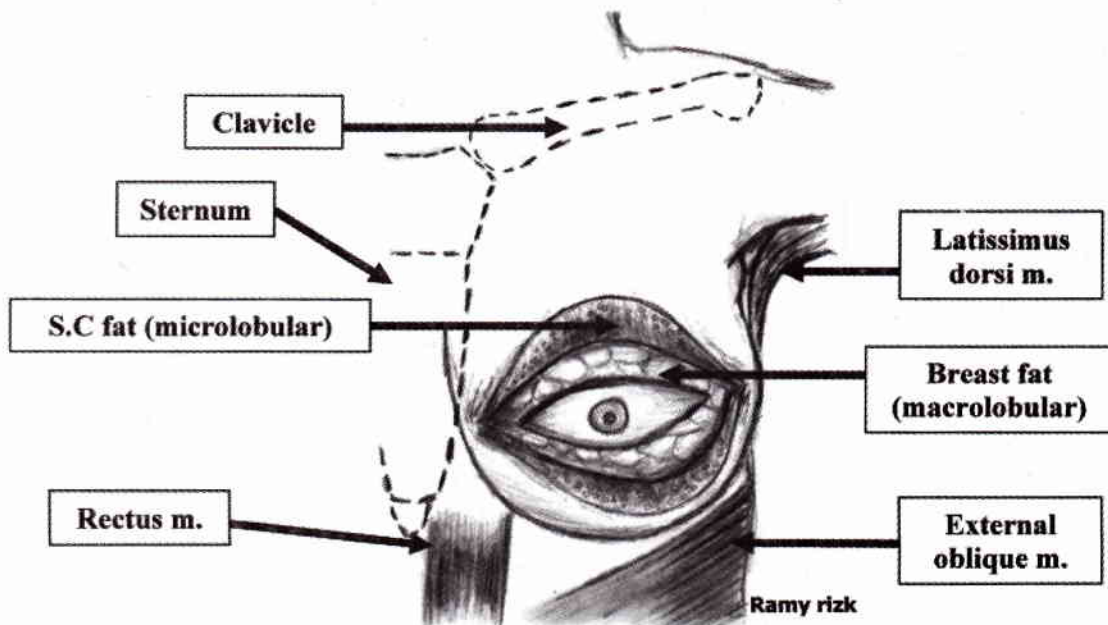
NB: the flaps

- Contain the underlying SC fat as it contains the blood supply of the skin.



N.B. How to differentiate S.C fat from breast fat?

(S.C. fat is microlobular ≠ breast fat is macrolobular).



→ The S.C fat should be the same thickness all through, to avoid the post-operative "Button-hole" appearance.

→ Extend from:

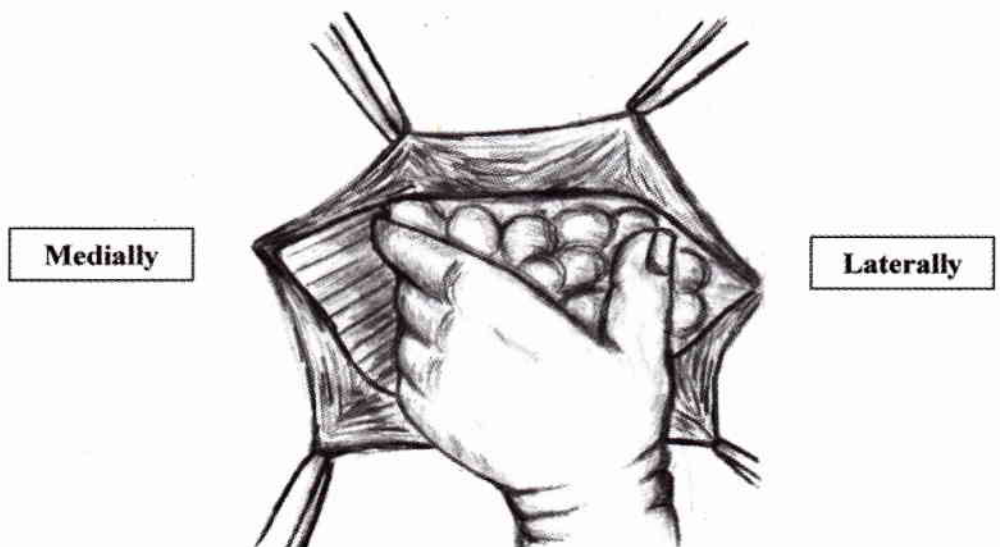
* **Sternum → medially.**

* **Lat border of latissimus dorsi → laterally.**

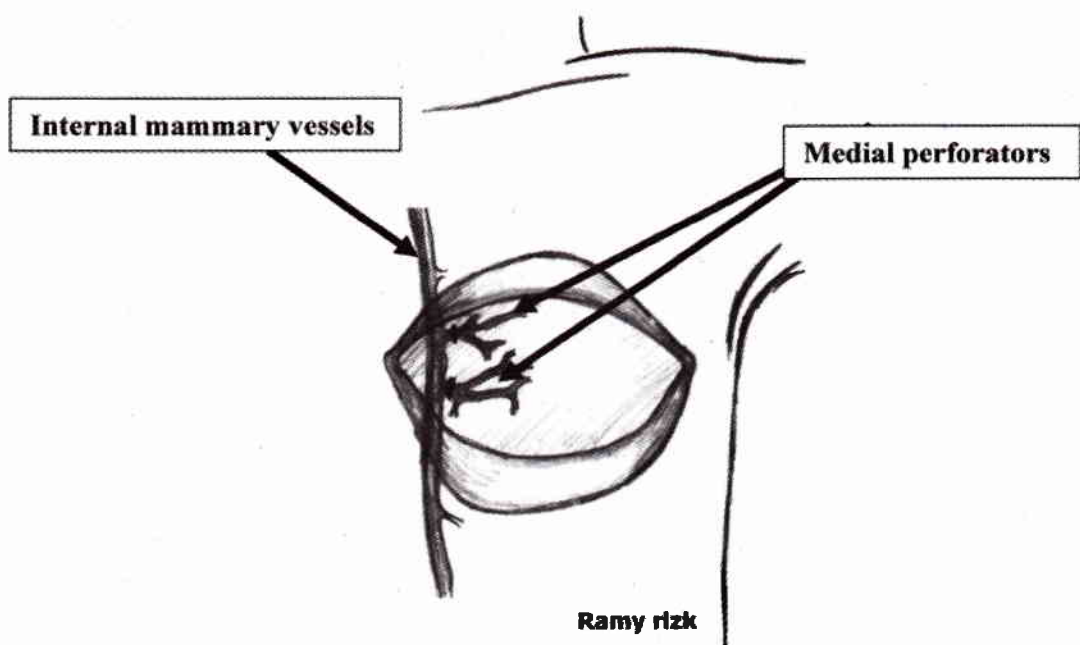
* **Lower border of clavicle → superiorly.**

* **Rectus sheath & ext oblique → inferiorly.**

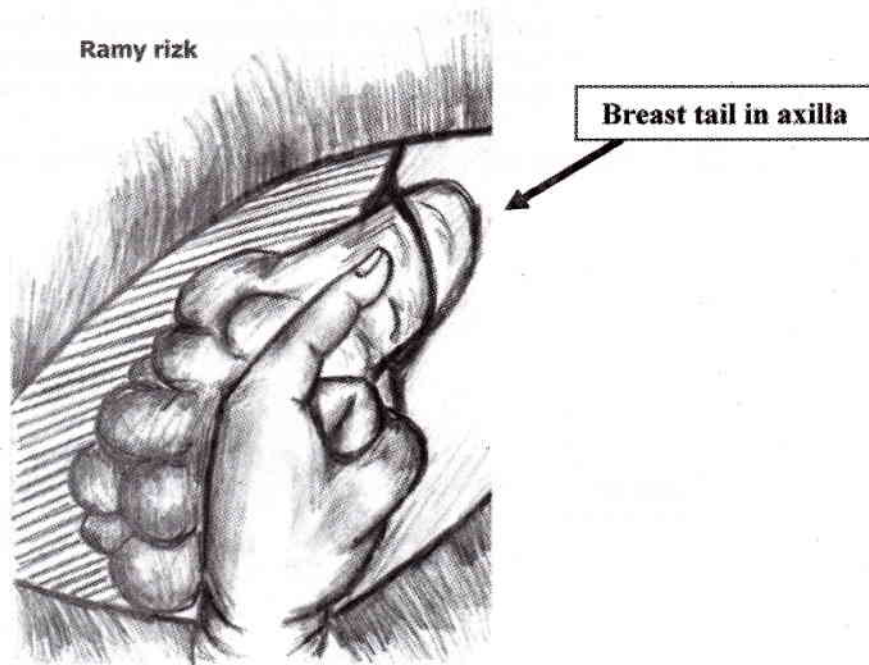
2) Sweep off the breast tissue (starting medially).



3) Ligate the perforating branches of the int. mammary vessels (medially)



- 4) Dissect the axillary tail by your finger from the opening of Langer



- 5) send the specimen for histological exam:

Closure:

- A- Absolute haemostasis.
- B- Place suction drains.
- C- Close the skin in a single layer with interrupted sutures.
- D-

Types of breast surgery for cancer breast:

1- Extended radical mastectomy:

= Remove:

- **2 skin:**
 - Over the tumor.
 - 5 cm safety margin.
- **2 breast:**
 - Breast tissue.
 - Breast nipple & areola.
- **2 ms:**
 - Pect. major.
 - Pect minor.
- **2 f:**
 - All fat.
 - All fascia.
- **2 LN:**

- Internal mammary L.Ns.
- Axillary L.Ns.

2- Radical mastectomy:

= Remove

- As 1.
- Except: internal mammary L.Ns.

3- Modified Radical mastectomy:

= Remove:

- As 2.
- Except pectoralis major.

4- Simple mastectomy & sampling of axilla:

= Remove:

- As 3.
- Except pectoralis minor.

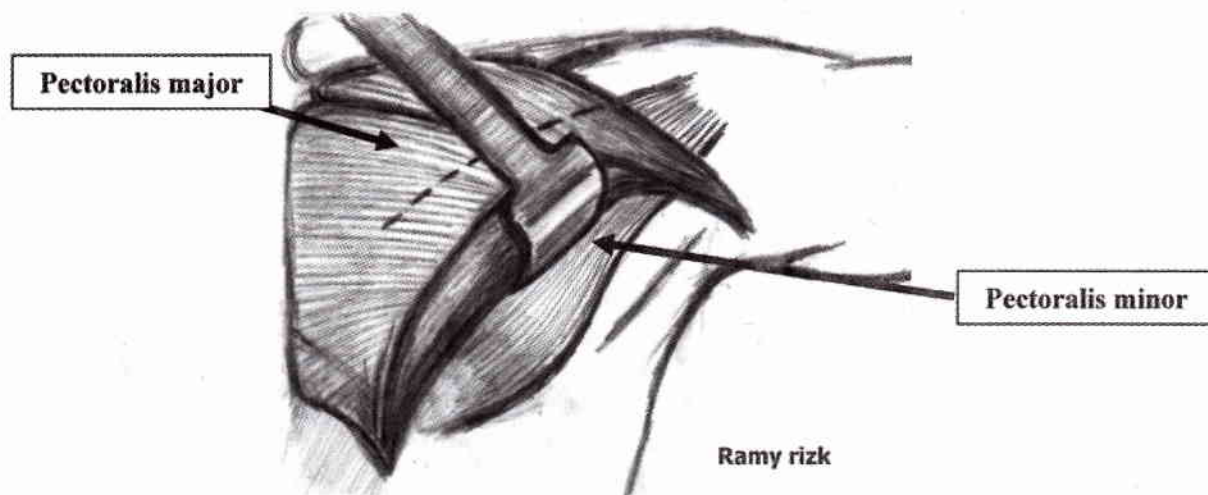
5- Lympectomy / Quadrantectomy

Modified Radical Mastectomy Patey's operation

Indications: → stage I & II breast cancer.

II, III, IV → 1, 2, 3, 4 (a, b) → as simple mastectomy.

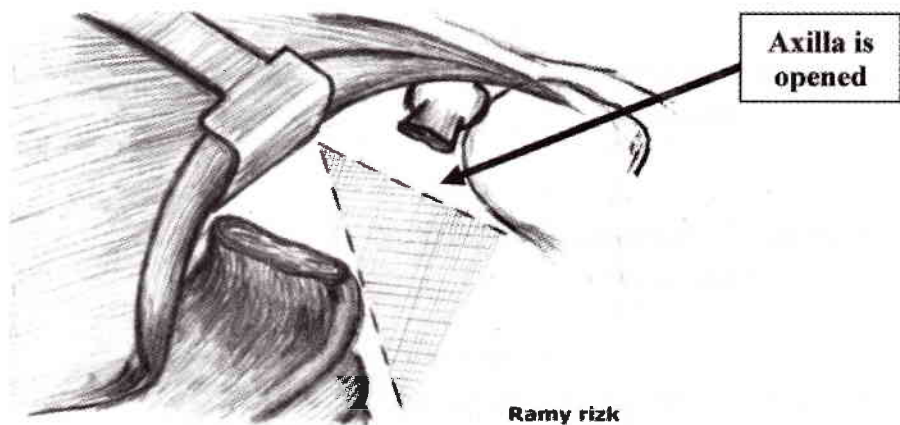
c) **Retract** the pect. major at its lateral border, so pect. minor is exposed.



d) **Divide** the pect. Min.or at its insertion (better as it is avascular).The axilla is exposed



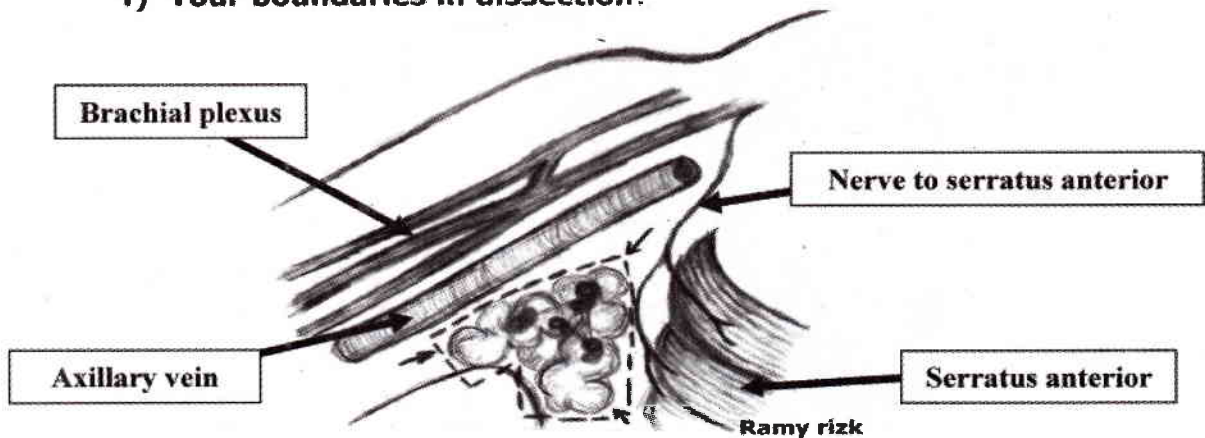
N.B. Pectoralis minor is called "Door of axilla"



e) Sweep off the axillary fat & LN in downward direction by a gauze



f) Your boundaries in dissection:



Above = axillary v. (to avoid br. plexus injury)



N.B. The landmark of the apical LN is the subclavius ms. & 1st rib.

Behind = until the ms of the post axillary wall
(= subscapularis, teres major, latissimus dorsi)

**N.B.**

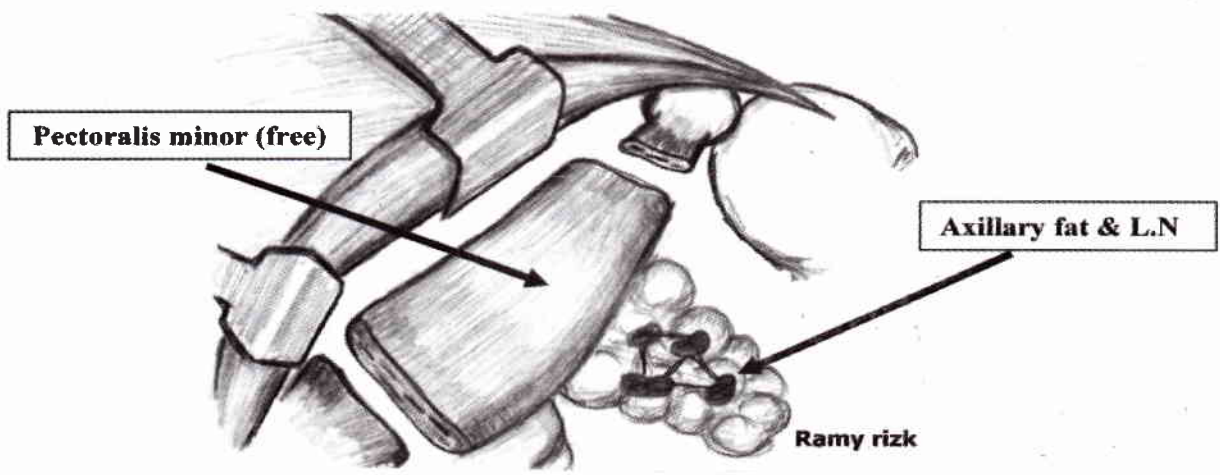
- 1- We do not get behind the subscapular vein to avoid nerve to lat. dorsi injury.
- 2- Nerve to lat. dorsi should be preserved as we may need the lat. dorsi as a myocutaneous flap for reconstruction; if skin necrosis occurs.

Medially = serratus ant (be careful for long thoracic nerve)
= n. to serratus anterior = n. of Bell



N.B. Injury to n. to serratus anterior leads to winging of the scapula.

- g) Separate the origin of pect. minor from its origin at the chest wall, this will free the specimen.

**Closure:**

- As simple mastectomy.
- A drain is left to avoid lymph collection (= seroma) as lymph vessels may continue to leak for 7-10 days.

V:- Complications:

- **Operative:**

- Primary hemorrhage: ttt by controlling the bleeding.
- Injuries: e.g:
 - o Axillary vein: repair or ligate if cephalic vein is intact.
 - o Nerve to Latissimus dorsi.
 - o Nerve to Serratus anterior.

- **Post operative:**

- At area of mastectomy:
 - o Seroma: ttt: Aspirate with asepsis.
 - o Sloughing of flaps: ttt: debride & use later skin graft.
 - o Gangrene.
 - o Scar shape (Cosmosis).
- At the arm:
 - o Brawny oedema (Lymphoedema).

Maden's modification of Patey's operation:

- As Patey's but with retraction of both pectoralis minor and major

N.B. Structures piercing the clavipectoral fascia:



- Art. = Thoracoacromial.
- Vein = Cephalic v. (if injured → brawny edema).
- Lymphatics.
- Nerve = Lateral pectoral n.

Types Modified Radical Mastectomy:

1. **Patey:** Removal of pectoralis minor → get access to level 3 lymph nodes.
2. **Scanlon:** cut pectoralis minor but not remove it.
3. **Maden:** preserve the pectoralis minor to allow only incomplete removal of level 1 and 2 lymph nodes.

Conservative breast surgery (segmental mastectomy):

1. **Indications:**

- Tumour 4 cm or less.
- Not multicentric.
- Size of tumour in relation to the size of breast.

2. **Contraindication:**

- Central tumours.
- Recurrence
- Patient well
- No facilities for radiotherapy.

عكس اللي فات +

3. **Position:**

- Supine and arm abducted.

4. **Incision:**

- Curvi linear incision (for tumour)
- Another transverse incision for axillary sampling.

Possible oral questions

- 1-What are Types of breast surgery for cancer breast?
- 2-Triple assessment of breast mass?
- 3-Anatomical landmarks and lymphatic drainage of the breast?
- 4-TNM staging and Manchester classification of breast cancer?
- 5-Indications and contraindications for breast conservative surgery?
- 6-Structures preserved and structures sacrificed in radical mastectomy?
- 7-Reconstructive breast surgery?
- 8-Management and drainage of breast abscess?

► **References:**

- B. & L. → p.846.
- Dixon and Sainsbury 2nd edition "Churchil Living Stone Edinburg"
- Haris, Lippman, Marrow M., Hellman S. (2000).
- Colour Atlas of Breast Disease "Mosby-Wolf" London.

Operations for Hernia:

Indirect Inguinal Hernia

Herniotomy

= **Reduction of the content + Excision of the sac.**

I- Indications:

- In infants & children with inguinal hernia.
- Before herniorrhaphy in adults.

II- Preoperative preparation:

- Exclude & correct the precipitating factors = ↑ intra abdominal pressure.
 - Stop smoking.
 - Weight reduction.
 - Treatment of resp. tract inf.
 - Treatment of S.E.P. & constipation.
- If the hernia is huge, prepare for postoperative ventilation.

III- Anesthesia: → general / spinal / local anesthesia.

IV- Steps:

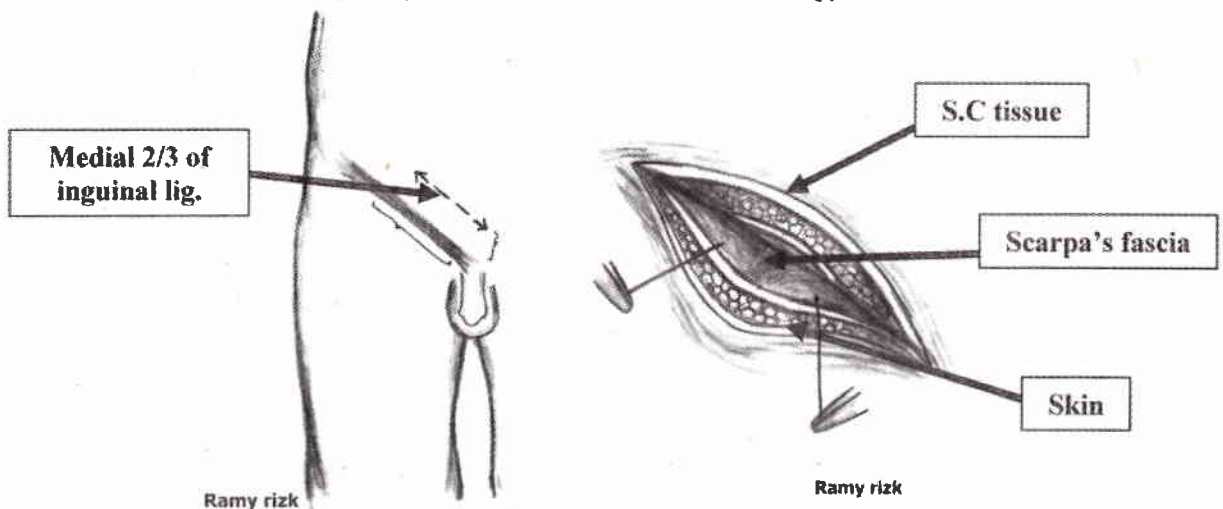
1- Position: → Supine.

2- Skin preparation:

- Betadine from umbilicus to mid-thigh.
- Tincture iodine is **better to be avoided** in the scrotum

2- Incision: (Groin incision)

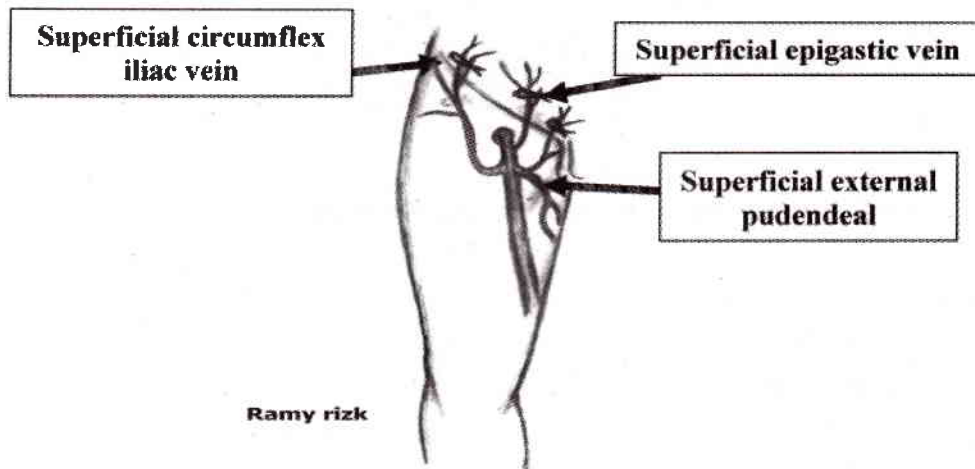
- **Oblique:** 3 cm above & parallel to the medial 2/3 of inguinal ligament.
(= from internal to external ring).



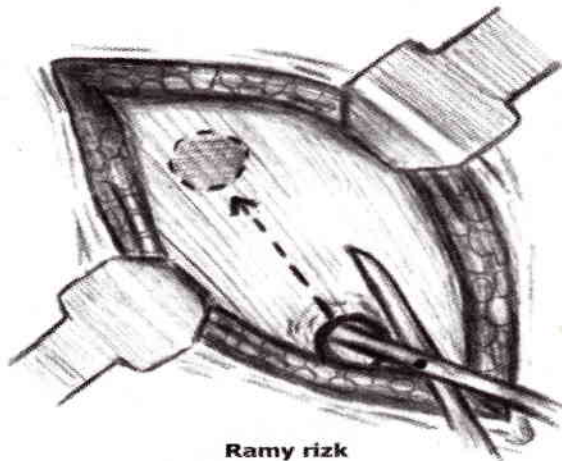
- **Transverse:** along the inguinal skin crease
(along Langer's lines = cosmetically better).
- It includes: skin, SC tissue, Scarpa's fascia.

3- Procedure:

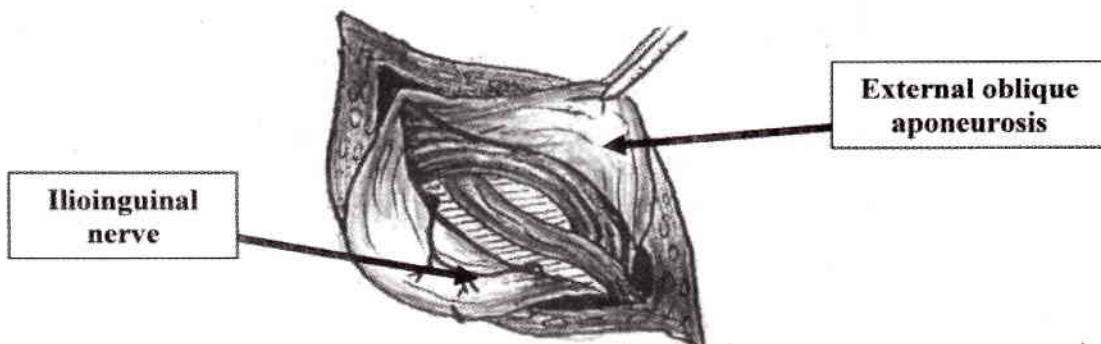
1. **Ligate & divide** the 3 superficial veins.



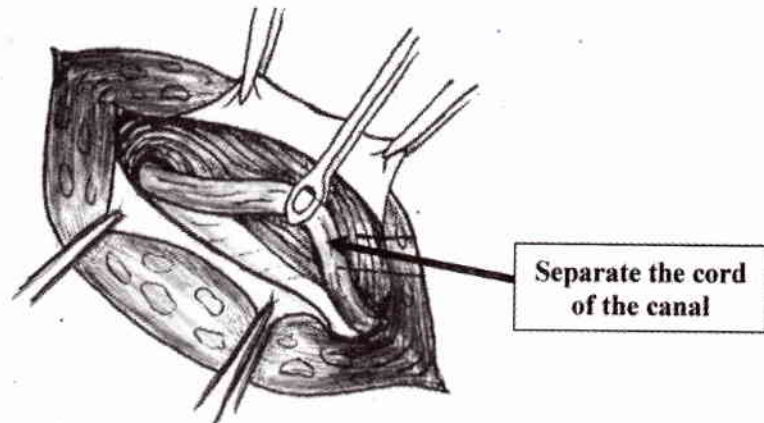
2. **Divide the external oblique aponeurosis** in the direction of its fibers (from the external ring extending laterally till the internal ring & little more).



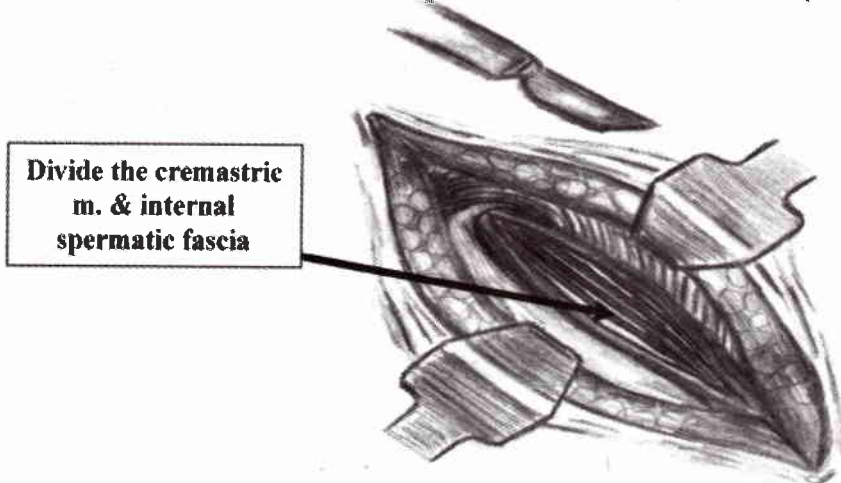
3. **Reflect the external oblique aponeurosis** & identify the ilioinguinal nerve & reflect it over the aponeurosis (injury of the ilioinguinal nerve at this level cause hypoesthesia in the scrotum only without any paralysis)



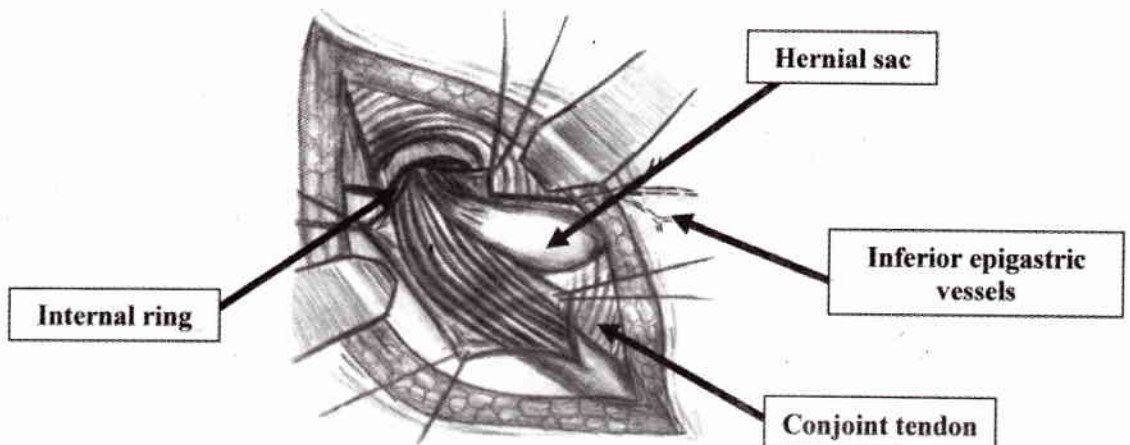
4. **Separate** the cord from the post wall of the canal.



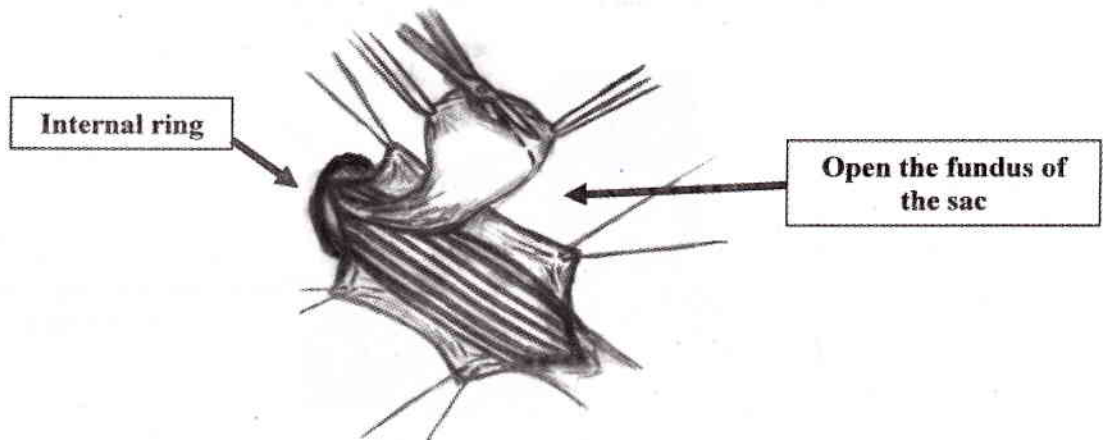
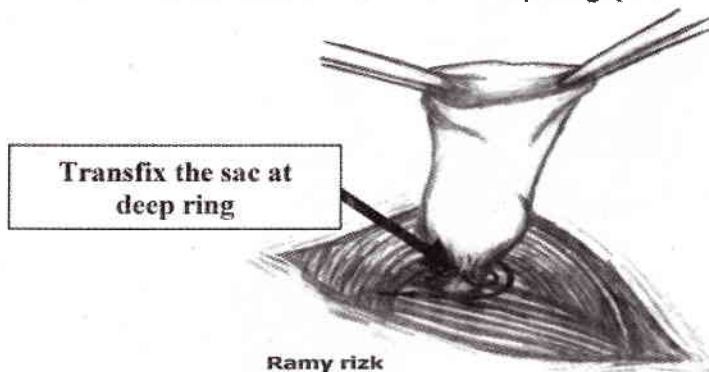
5. **Divide** the cremasteric muscle & internal spermatic fascia.



6. **Dissect the sac** (= pearly white in color, anteromedial to the vas).



7. **Dissect the hernial sac up to its neck** being known by:
- a- The narrowest part of the sac.
 - b- Extra-peritoneal collar of fat.
 - c- Inferior epigastric a. is medial to it.

8. Open the fundus of the sac.**9. Reduce the contents.****10. Transfix the sac at the deep ring (after twisting it for several times).****11. Excise the redundant sac.****NB:**

1. Effective transfixation is known by slippage of the neck into abdomen on cutting it.

If the sac is the processus vaginalis:

- Reduce the contents.
- Divide the sac.

2. Transfix the proximal part & excise it leaving the distal part around testis).

Herniorraphy

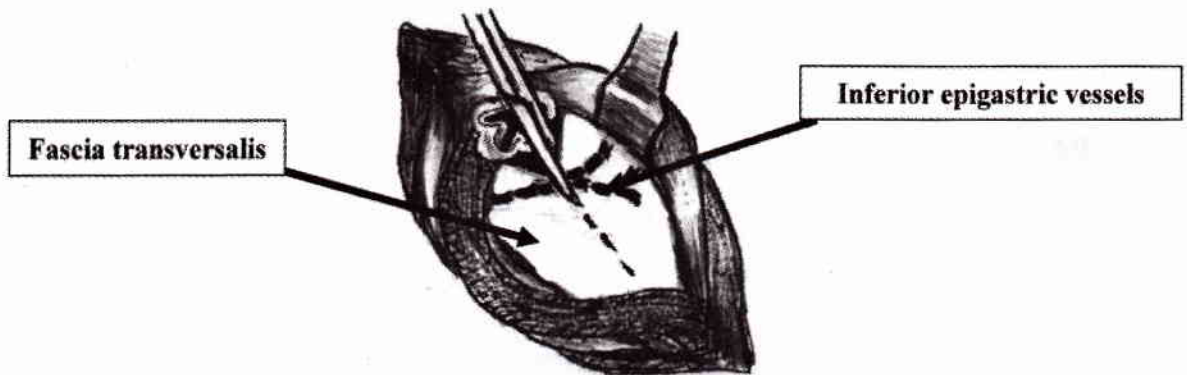
= Close the defect in the weak canal by suturing

Indication: → It is the standard operation in adult hernia.

III- IV: → As herniotomy → Then →

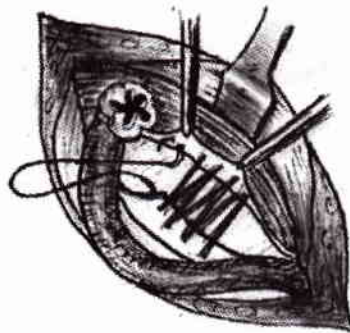
Shouldice's repair = 3 double breasting:

- **Fascia transversalis** is incised along the length of the canal starting from the internal ring to the pubic tubercle.

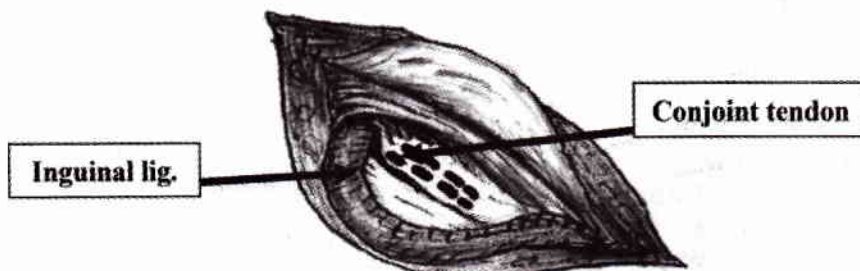


- Then 3 double-breasting is done:

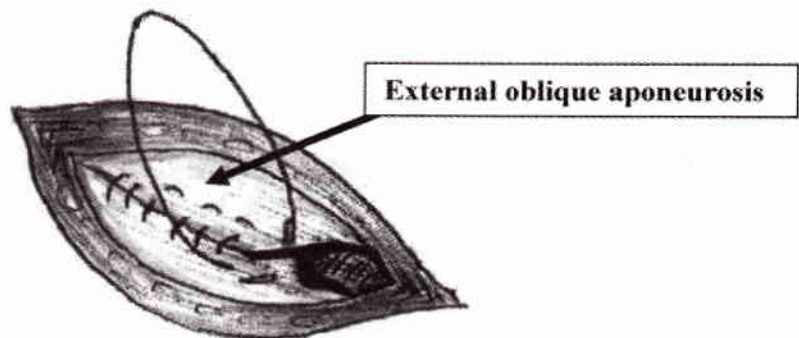
1- Double breasting to the fascia transversalis behind the cord



2- Double breasting of the conjoint tendon to the inguinal ligament behind the cord.

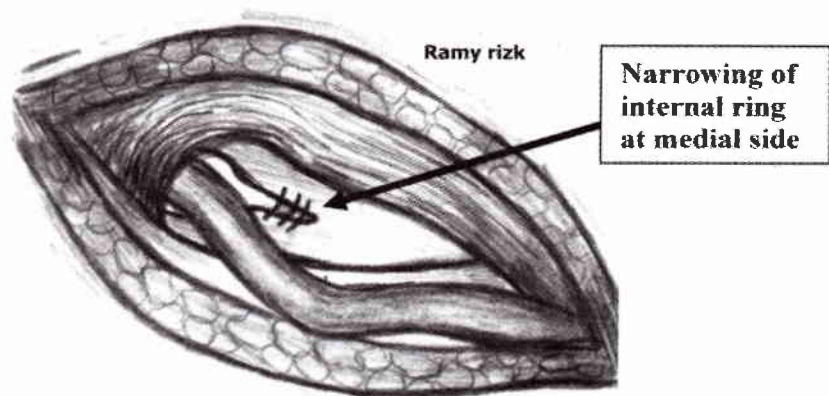


3- Double breasting of the external oblique aponeurosis in front of the cord



Bassini's repair:

- 1- **Narrowing of internal ring** (from medial side as this ↑ distance between internal & external rings = ↑ the canal obliquity which is an antihernial factor).



- 2- ± **Plication of fascia transversalis** (interrupted sutures).
- 3- **The conjoint tendon is sutured** to the inguinal ligament behind the cord by non absorbable prolene interrupted sutures.



N.B. *The sutures are from the under surface of the conjoint tendon because it's more tendinous.*

- 4- **Close the external oblique aponeurosis** one layer in front of the cord.(as before).
- 5- **Tanner's releasing incision** is a 5 cm incision in rectus sheath starts at the pubic crest to 2 cm from lateral edge of rectus abdominis muscle which can relief tension on conjoint tendon if present due to Bassini's repair.

Disadvantages:

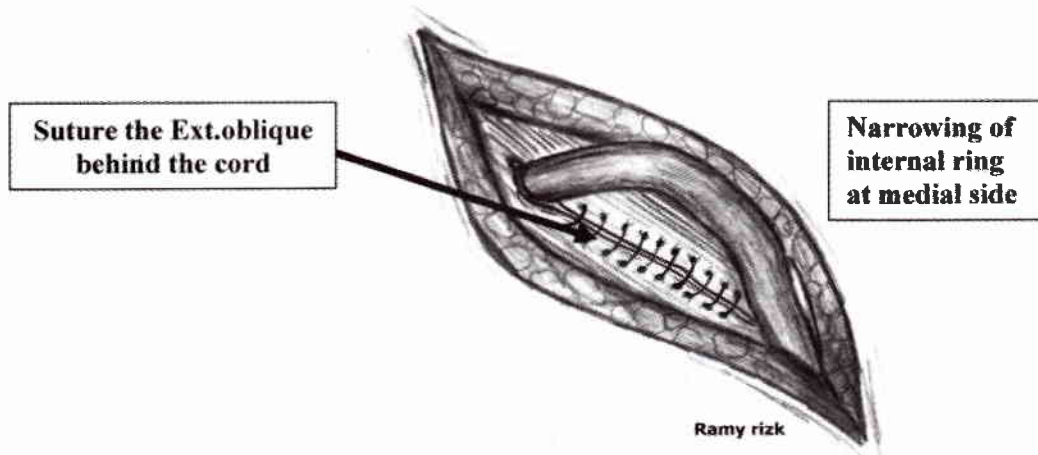
- Interferes with shuttering mechanism of conjoint tendon.
- Bad healing as it involves suturing tendon to tendon, so: we use prolene sutures.
- Tension atrophy of the conjoint tendon.

McVay Repair: (Marcy)

- 1- Narrowing of the internal ring (from the lateral side).
- 2- Suturing of:
 - The thickening in the fascia transversalis below the conjoint tendon (= Transverse aponeurotic arch).
 - To the thickening in the fascia transversalis below the inguinal ligament (= iliopubic tract).

Halsted repair:

Incise the ext oblique aponeurosis & put it behind the cord to strengthen the post wall of the canal.

**Disadvantages:**

- The cord is covered with skin only (= liable to trauma → sterility)
- It is done only for old age.

Hernioplasty**By:**

A- Darning.

B- Grafting:

1. Natural.

→ Skin (Obsolete for fear of forming implantation dermoid cyst).

→ Fascia Lata .

2. Synthetic

→ Prolene (better✓✓).

→ Mercilne.

→ PTFE.

→ Marlex.

→ Dacron.

→ Daxon.

Types:

→ **Onlay** = in front of fascia transversalis or muscles of the ant. abdominal wall (commonly in use✓✓).

→ **Inlay** = In front of the peritoneum.

→ **Sublay** = below peritoneum.

Indications:

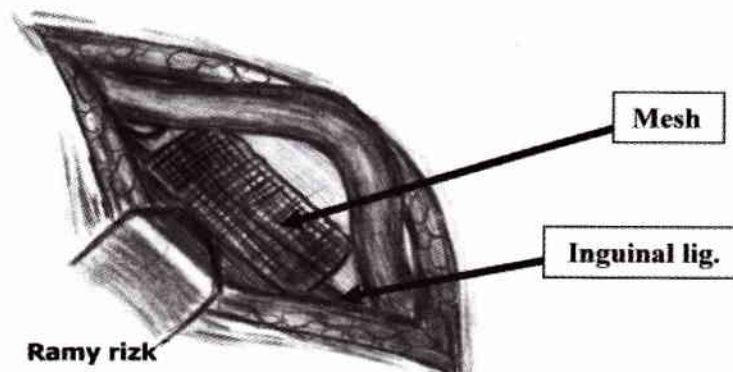
- 1- Very weak abdominal wall.
- 2- Large defect.
- 3- Recurrent hernia.



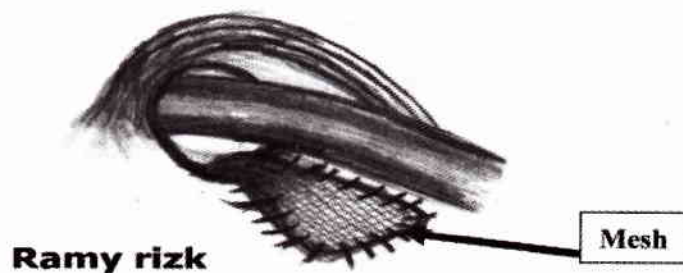
N.B. Contraindicated in strangulated hernia as the field is potentially infected

Technique:**A- Tension free mesh (Leichtenstein):**

- Put a mesh on the post. wall of the inguinal canal → the mesh induces fibrosis (not mechanical pressure).
- The external oblique is closed over the cord.

**B- Mesh plug technique (for small hernia):**

- Push a triangular mesh in the internal ring & suture it.
- The ext oblique is closed over the cord.

**C- Recently:**

- Double mesh system.
- Laparoscopic repair with mesh: Extra- or Intraperitoneal.
- Preperitoneal approach (Nyhus).
- Trans external ring laparoscopic tension free repair.

**N.B. Inguinal hernia in female:**

- Dissect the sac → transfixation & excision.
- Excision of round ligament.
- Obliteration of posterior wall of the canal.

Direct Inguinal Hernia

Invagination of the sac

- Apply purse-string.
- Invaginated sac.
- Tighten the purse-string.
- We do tension-free mesh.



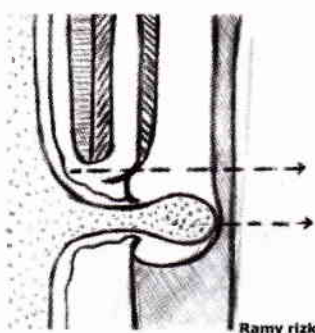
Hernioplasty

= Tension free mesh.

Femoral Hernia

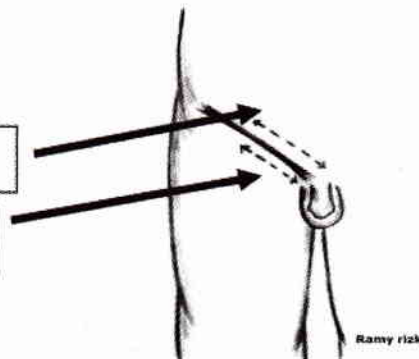
Low approach (Lockwood's)

Incision: → 1 cm below & parallel to the inguinal ligament (medial 3/5) i.e. over saphenous opening.



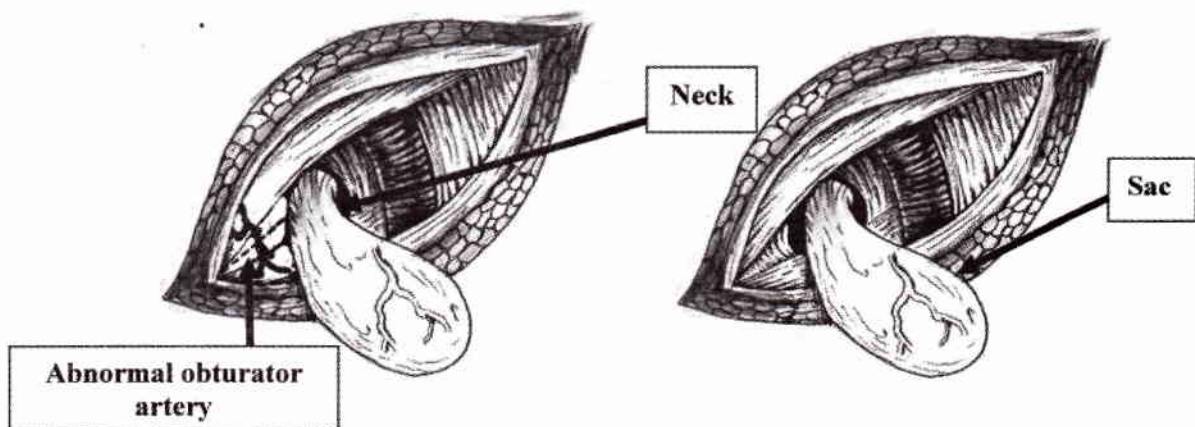
High approach

Low approach

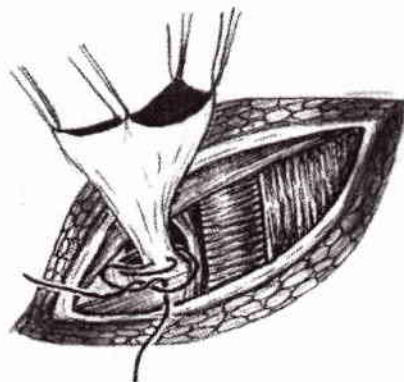


Procedure:

1. Incise the skin, SC tissue, Scarpa's fascia to expose the sac.
2. Expose the sac by gauze dissection up to its neck.

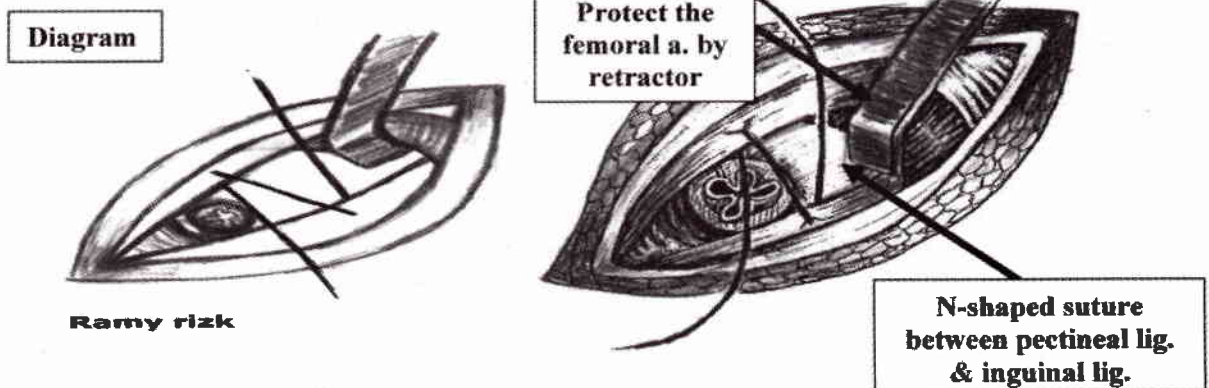


3. Open the sac at the fundus
4. Return the contents to the abdominal cavity.
5. Dissect the neck of the sac away from the margins of the femoral ring.
 - If the defect is narrow, we have to cut the lacunar ligament this injures the abnormal obturator artery.
6. Transfix the sac as high as possible & divide it → = Herniotomy.



Repair:

- Place N-shaped sutures between pectineal & inguinal ligaments.
- Protect the femoral v. by a retractor or the assistant finger.
- Avoid narrowing around the femoral v. which may interfere with its distention).



Advantages:

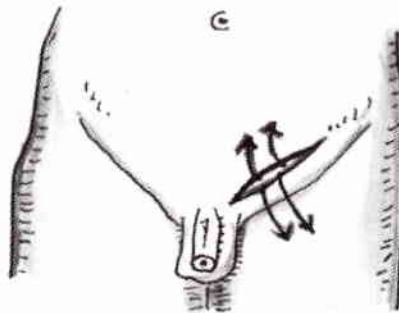
- 1- Direct & rapid approach (easy to reach fundus).
- 2- Inguinal canal is not opened.

Disadvantages:

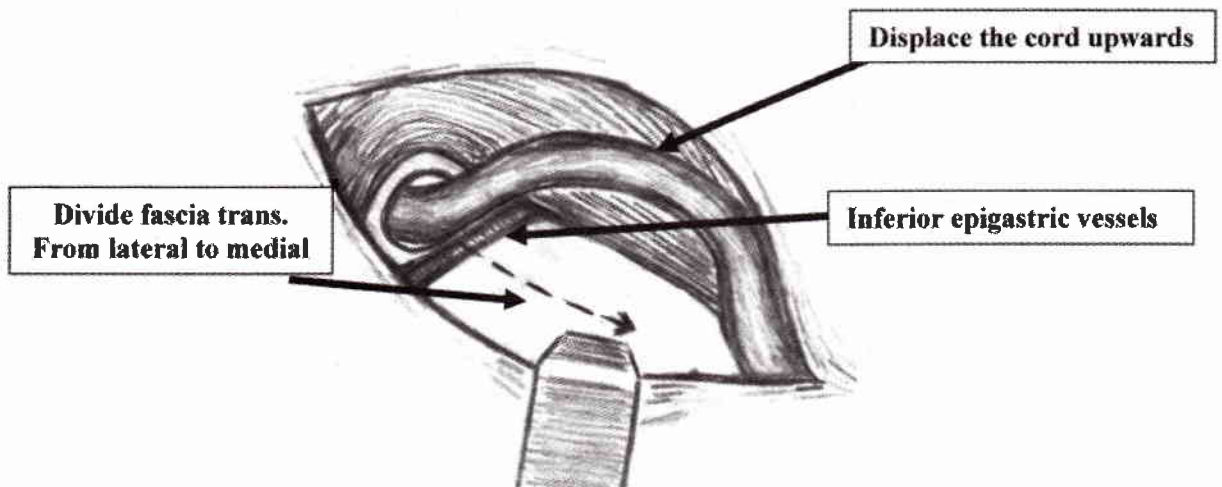
- 1- Sac may be not completely excised (difficult to reach neck).
- 2- Not suitable for strangulated hernia:
 - Abnormal obturator a. may be injured (during division of constricting ring).
 - Gangrenous loop can't be resected.

Inguinal approach (Lotheissen's)

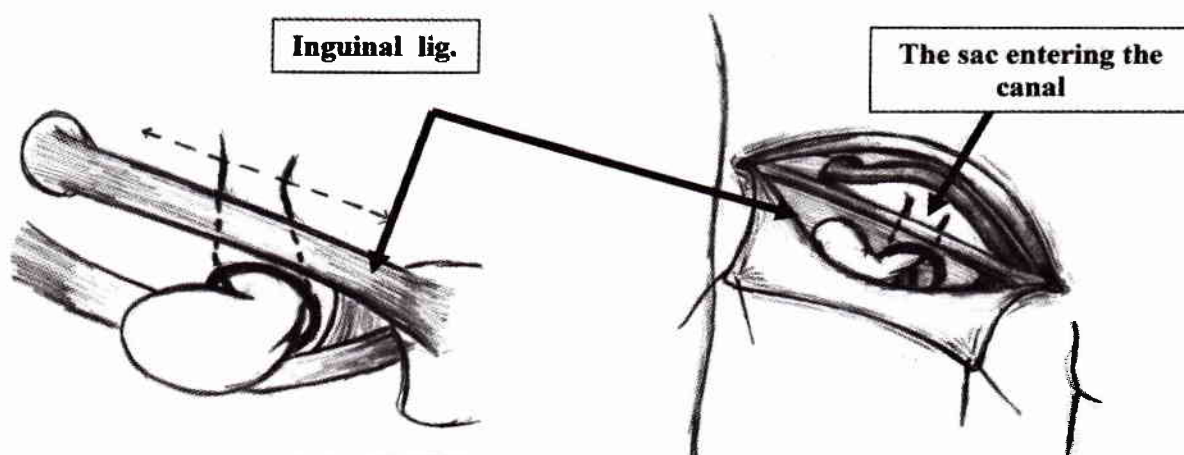
Incision: As the inguinal hernia & retract the skin above and below.

**Procedure:**

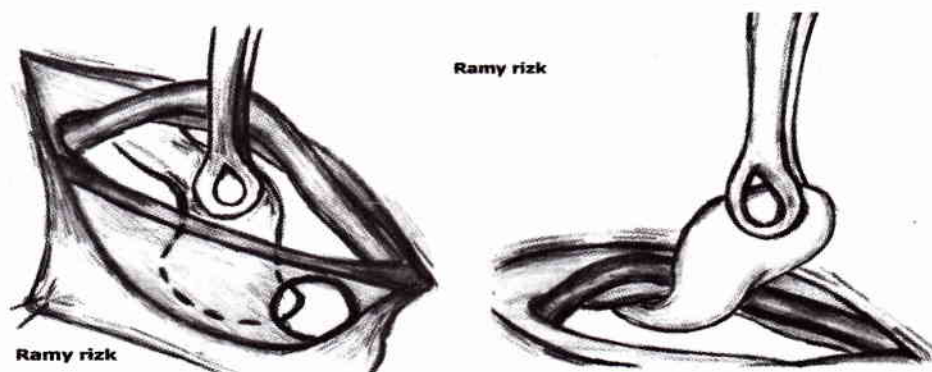
1. After opening the canal displace the cord (or round ligament) upwards
2. Divide the fascia transversalis (from lat. to medial to be aware of the inferior Epigastric vessels at the medial boundaries on the int. ring).



3. Extraperitoneal fat is cleared by gauze dissection until the sac is seen entering the femoral canal.



4. The sac is withdrawn upwards by gentle traction through the incision in the fascia transversalis



5. Reduce the contents.
 6. The neck is transfixed & the sac is cut off
 7. Obliterate the femoral canal by suturing the pectineal lig. with the ing. lig.
** If the hernia is strangulated:*
 → Division of the constricting ring (Lacunar ligament) is done.

Advantages:

1. Sac can be completely excised (easy to reach neck).
2. Suitable for strangulated hernia.
 - Abnormal obturator a. can be visualized & protected (during division of constricting ring).
 - Gangrenous loop can be resected.

Disadvantage: Inguinal canal is opened → may be weakened.

Mc Evedy's

Incision:

- Incise the rectus sheath (lower paramedian incision) & push the rectus ms medially to set access to the inguinal canal from the medial side.

Procedure:

- As high approach but from the medial side.
- The femoral canal is obliterated by suturing pectineal lig with inguinal lig.

Advantage:

- Roomy space.

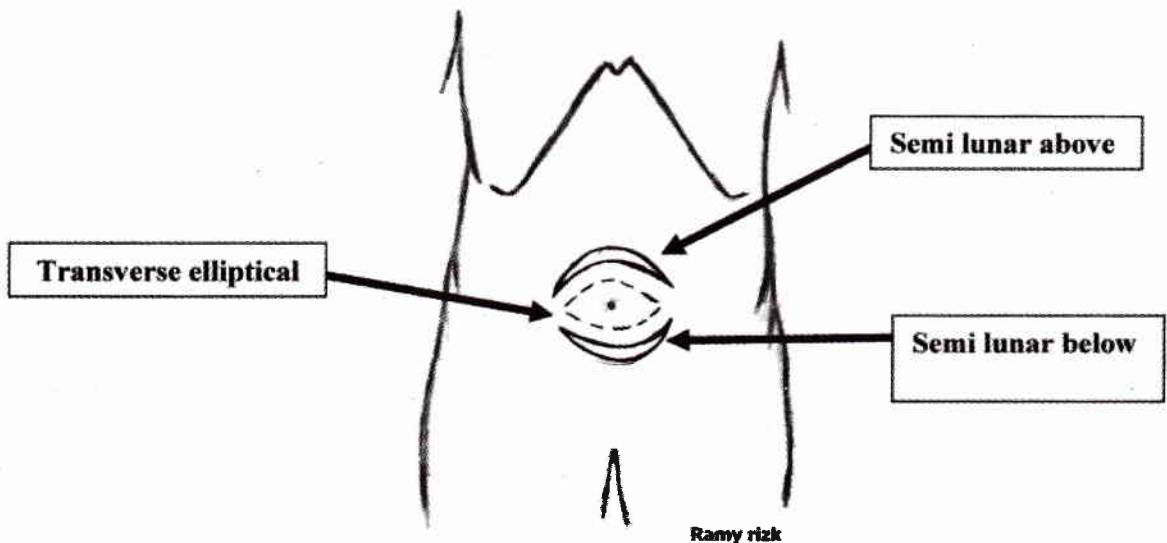
Disadvantage:

- Injury to nerve supply of the rectus m. because it comes from the lateral side
 → Incisional hernia.

Paraumbilical hernia

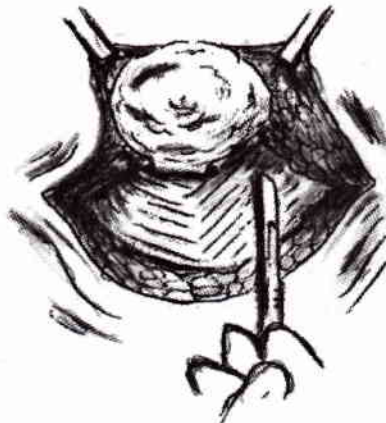
Incision:

- 1- If above the umbilicus → semilunar incision above it.
- 2- If below the umbilicus → semilunar incision below it.
- 3- If large defect with unhealthy skin → transv. elliptical incision over it.
- 4- Vertical incision may be used especially with divercation of recti.

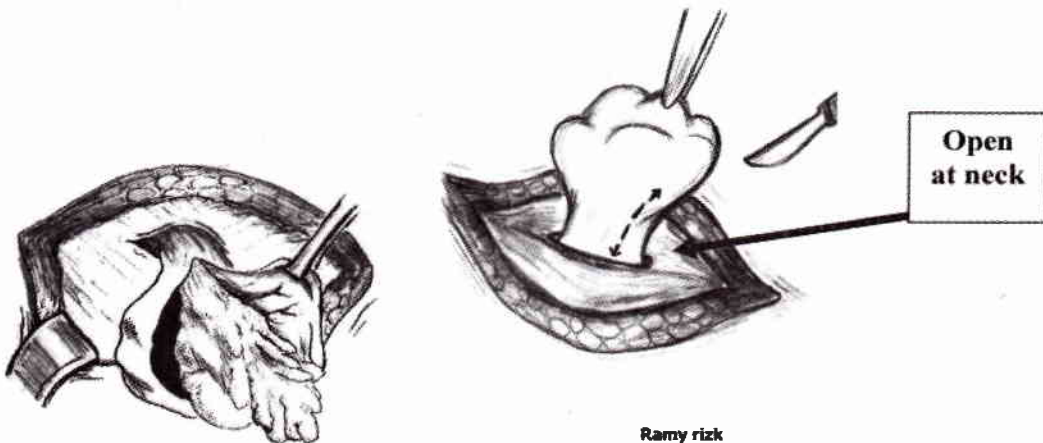


General procedure:

- a- The incision is deepened through the SC fat until the rectus sheath is seen.
- b- Dissect the neck of the sac from all directions by cleaning of fat of surrounding fascia.



- c- Open the sac at its neck: (as the fundus is multiloculated and there is adhesions between the fundus and contents but there is no adhesions at the neck)

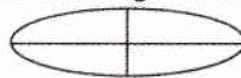


d- free the contents & Reduce it

e- Excise the sac

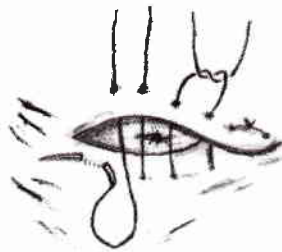
A- Mayo's repair:

a- The defect is enlarged laterally (to the edge of recti) as we try to do ellipse with a ratio 3 : 1



b- If the defect is rounded dog ears will be formed during closure

c- Double breasting of the aponeurosis can be done (**mattress sutures in such a way that the upper flap becomes over the lower one.**)



d- Closure with suction drain.

Disadvantages:

- 1- **High tension** on the suture line (on bending backward) with ↑ risk of recurrence.
- 2- Peritoneum of upper flap is in contact with rectus sheath → irritation → exudation & infection.
- 3- Recurrence in 25% of cases.

B- Anatomical repair (Better ✓):

Through the incision we do repair of the linea alba from above downwards including the defect of the hernial sac either by:

a. **Mass closure:** Suturing the upper flap to the lower one as one layer without overlapping.

b. **Layered closure:**

1st layer: Peritoneum & posterior rectus sheath.

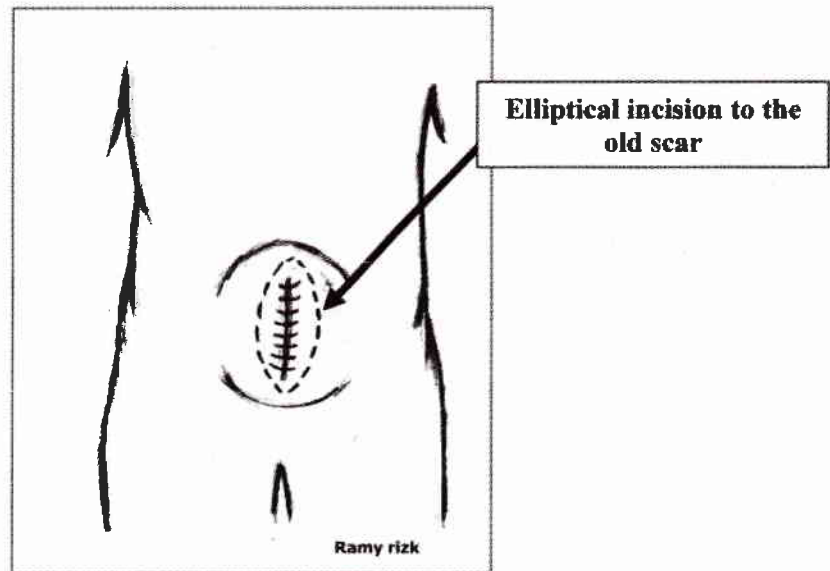
2nd layer: Muscles (Hemostatic).

3rd layer: Anterior rectus sheath.

Umbilical Hernia for children

- **As Mayo's repair.**
- **N.B.:**
 - We must do subumbilical incision not supraumbilical because it leaves an ugly scar.
 - We have to preserve the umbilicus to avoid psychological disturbances.

Incisional hernia



Anatomical Repair

Incision: → Ellipse in the skin to excise the old scar.

Procedure:

- a- Dissect the sac till the neck.
- b- Open the sac at the neck.
- c- Perform herniotomy as paraumbilical hernia.
- d- Excise fibrous tissue from all around the defect (freeing of the edge).

Closure: → In separate layers:

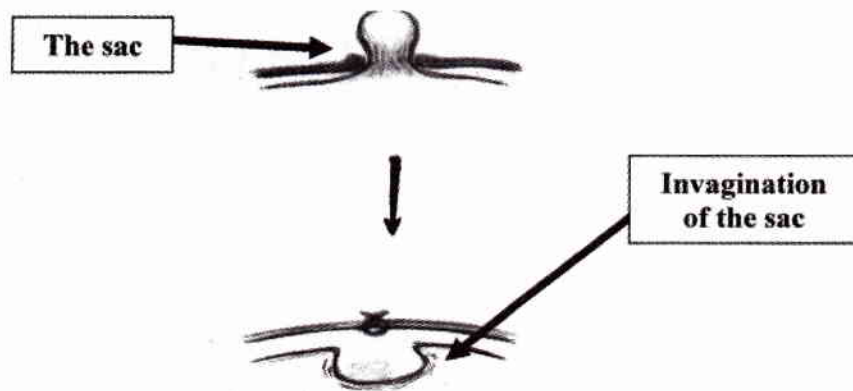
- 1- Peritoneum.
- 2- Int. oblique, transversus abdominis.
- 3- Ext. oblique.

Keel Repair

Incision: → Ellipse in the skin to excise the old scar.

Procedure:

- a- Dissect the sac till the neck.
- b- Invaginate the sac (like a keel).



- c- Close the defect without freeing of the edge.
- d- Close the skin.

Disadvantages:

- Bad healing (so: use prolene sutures).
- There may be adhesions between the sac & contents (→ intestinal obst.).

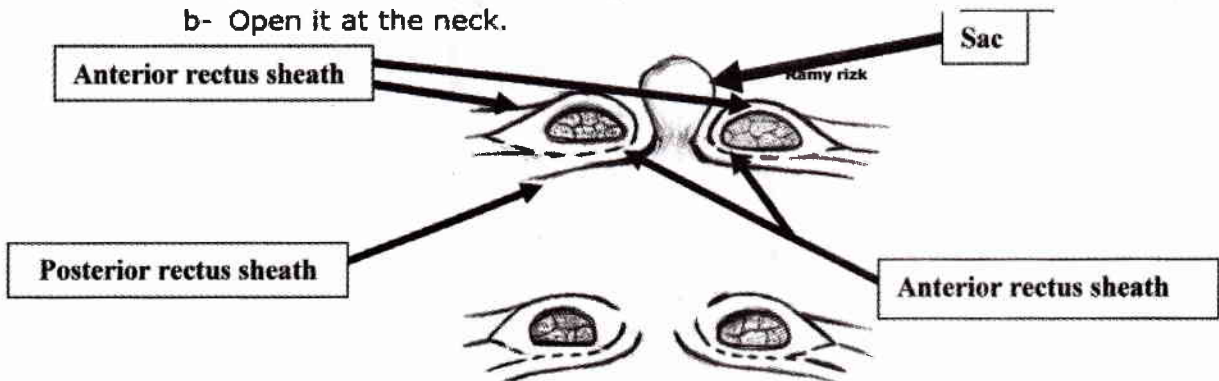
Five layer repair: Cattle's Repair

Indication: → For midline incisional hernia.

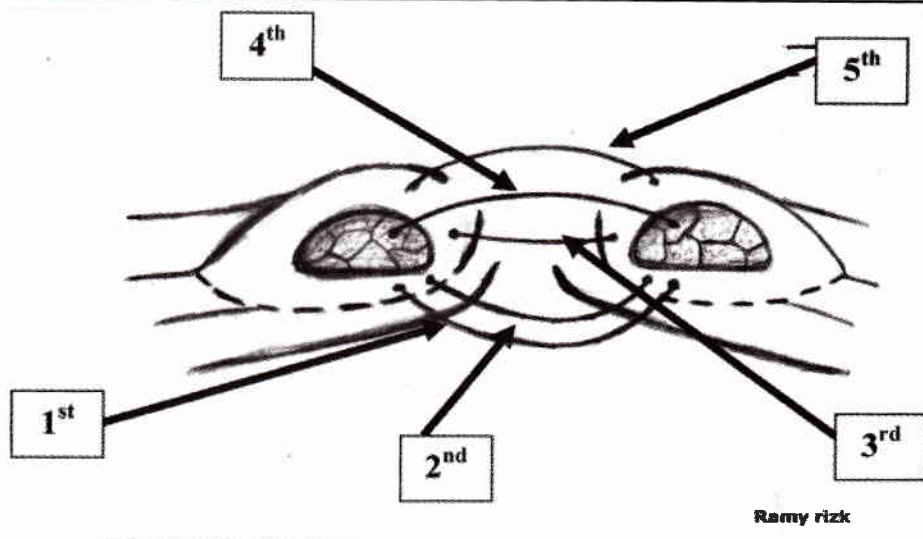
Incision: → Ellipse in the skin to excise the scar.

Procedure:

- a- Dissect the sac till the neck.
- b- Open it at the neck.



- c- Perform herniotomy as usual.
- d- Repair in five layers:
 - 1st:** peritoneum & post rectus sheath on both sides.
 - 2nd:** peritoneum & post rectus sheath on both sides.
 - 3rd:** ant rectus sheath on both sides then push inwards.
 - 4th:** rectus ms on both sides.
 - 5th:** ant rectus sheath on both sides in front of the rectus ms.



Possible oral questions

- 1- Types of hernia (external and internal hernia)
- 2- Differences between viable and non-viable intestine
- 3- Management of strangulated hernia
- 4- Anatomy of : abdominal wall, inguinal canal, femoral canal, hasselbach's triangle
- 5- Rare types of external hernia
- 6- What is meant by : pantaloon hernia, sliding hernia, Richter's hernia, Littre's hernia, maydl's hernia
- 7- Complications of truss
- 8- How can you identify the sac and neck of the sac??
- 9- What are types of repair you know?
- 10- Advantages and disadvantages of:
Low and high approach of femoral hernia
- 11- How can you repair umbilical and incisional hernia

► References:

- B. & L. → 73 P.1273.
- Delvin, B. and Kingsnorth (98) 2nd edition, Arnold, London.
- Nyhus, L.M. and Condon (2001) 5th edition, Philadelphia.

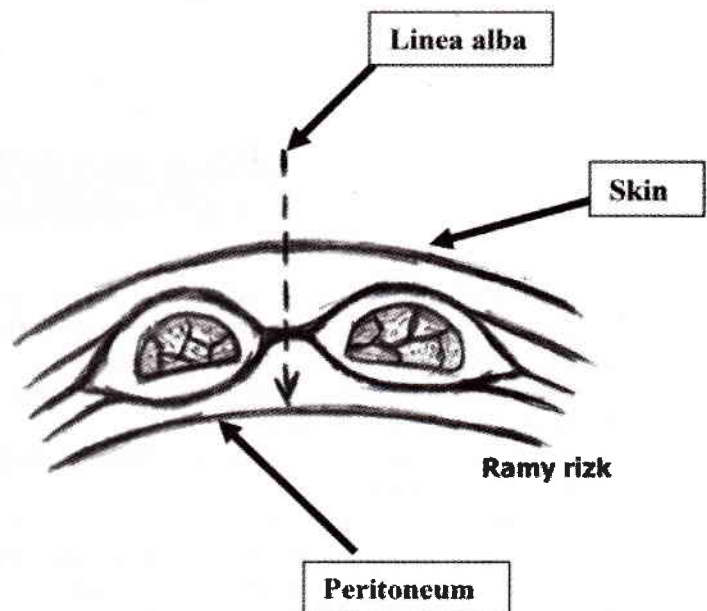
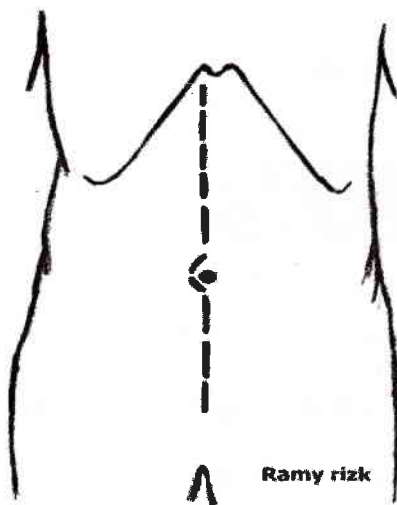
Abdominal incisions: Midline Incision

Indications:

→ Emergency.

Incision:

- Skin.
- Superficial Fascia.
- Linea alba.
- Peritoneum.

**Advantages:**

- Rapid.
- Exploratory.
- Less bleeding.

Disadvantages:

- Weakening of linea alba → bad healing, hernia (but less to occur because of non-absorbable prolene sutures).
- Bad cosmesis.

Paramedian Incision

1. Upper paramedian: (from xiphisternum above till below the umblicus)**2. Lower paramedian:** (from symphysis pubis below till above the umblicus)**Incision:**

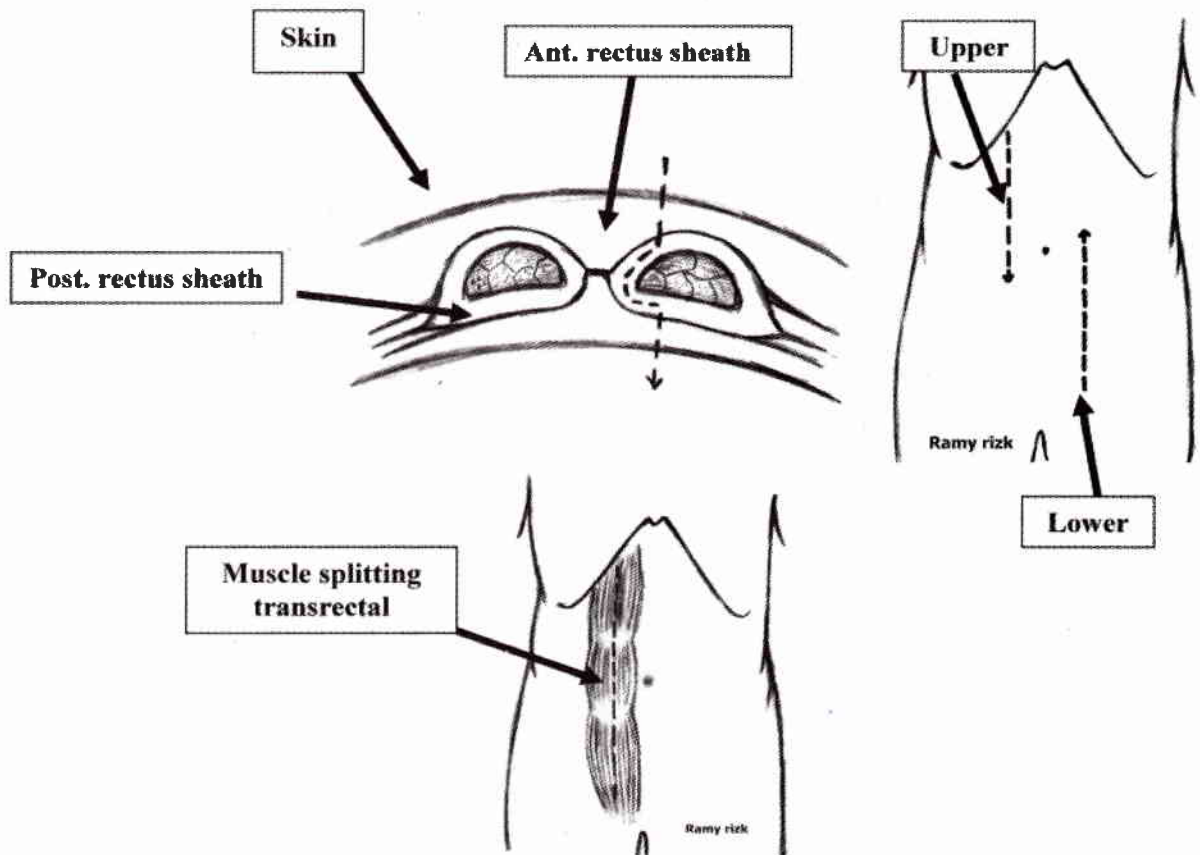
- Skin.
- Superficial fascia.
- Ant rectus sheath.
- Retract the rectus m. laterally (nerve supply comes from lateral side).
- Posterior rectus sheath (absent in lower paramedian incision).
- Peritoneum.

N.B. We can cut rectus muscle longitudinally instead of retracting it laterally; this is called "Muscle cutting transrectal"



Disadvantages:

The medial part becomes devitalized due to cutting of both nerve & blood supply.



Closure:

- Peritoneum, post. & ant. rectus sheath are closed by prolene.
- S.C. → chromic.
- Skin → silk.
- Peritoneum, post rectus sheath → continuous sutures.
- Ant. rectus sheath → interrupted sutures.

Advantages:

- Low incidence of incisional hernia.
- Exploratory.

Disadvantages:

- Not passing with Langer's lines.
- Time consuming than midline.
- More bleeding than midline.

Subcostal incision (if in Rt. side = kocher)

Indications of kocher incision:

- Sure diagnosis of chronic calcular cholecystitis with no other associated lesions (as Saint's or Wilkie's triad).
- Wide subcostal angle.
- Lt. Subcostal incision for splenectomy.

Incision:

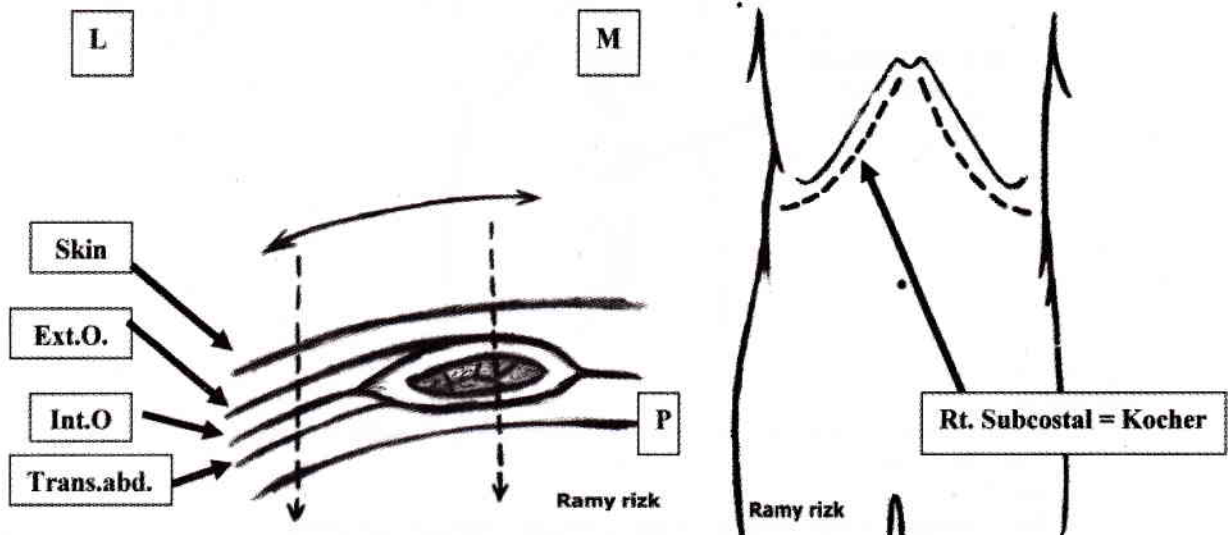
- Skin.
- S.C.
- Then:

Medially:

- Ant rectus sheath.
- Rectus m.
- post rectus sheath.
- Peritoneum.

laterally:

- External oblique m.
- Internal oblique. m.
- Transversus abdominus m.
- Peritoneum.



NB: The 8th, 9th, 10th intercostal nerves, are found running downward & medially between int. oblique & transv. abd. So it is better to preserve them. (if cut > 2 nerves → paralysis)

Closure:

in 3 layers

medially:

- Peritoneum.
- Post rectus sheath.
- Ant rectus sheath.
- Skin.

laterally:

- Peritoneum.
- Internal oblique & transv. abd. with post. rectus sheath.
- Ext. oblique with ant rectus sheath.
- Skin.

NB: DO NOT suture the rectus muscle

Advantages:

- Cosmetically better.
- The liver supports the incision if on the right side.
- Direct access (e.g. to gall bladder)

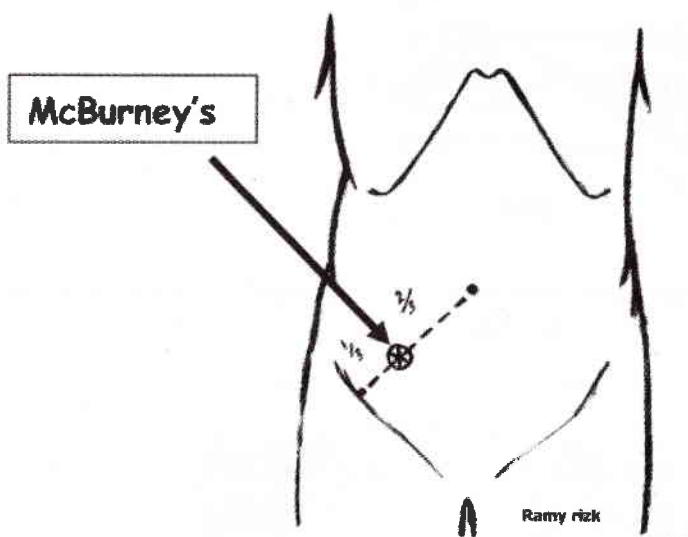
Disadvantages:

- More bleeding (= blood loss).
- Injury to 8, 9, 10th nerves (= nerve loss).
- Time consuming (= time loss).
- Not exploratory.

Grid-iron incision

Incision:

- It is 5-7 cm in length centered over McBurney's point (= base of the appendix).



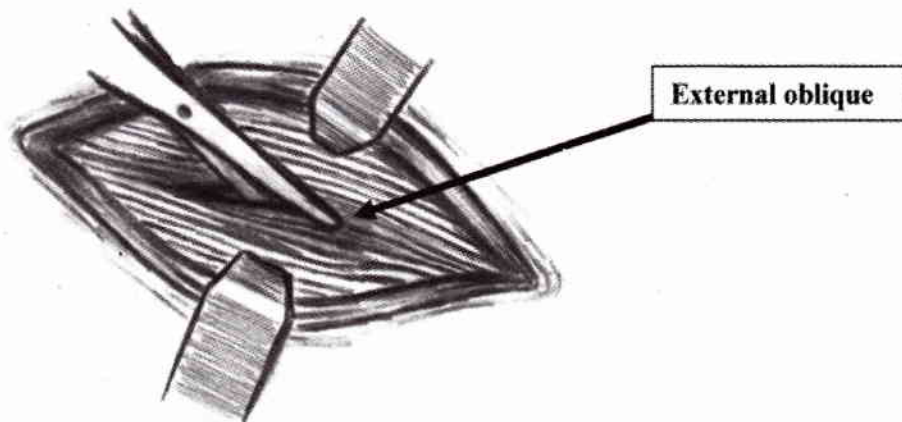
a- open skin, subcutaneous tissue, & Scarpa's fascia

N.B:

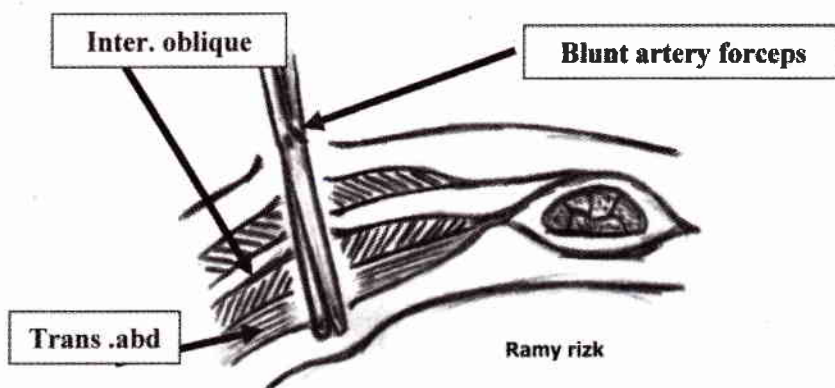
1. Superficial circumflex iliac vessels should be ligated if they are injured, as their injury may lead to haematoma around the penis, scrotum, perineum, or ant. abd wall post operatively)
2. Superf. Circumflex → artery → from the femoral
→ vein → to the saphenous



b- Split ext oblique aponeurosis in line of its fibers



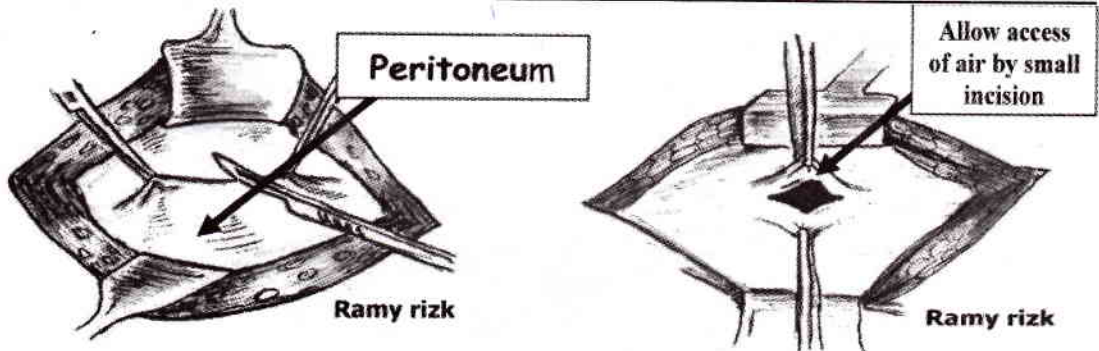
c- Split internal oblique & transversus abdominus with blunt artery forceps (as they are adherent to each other) till the resistance gives away.



d- Peel the peritoneum from transversus abdominus (to enable us to stitch it as a separate layer during closure)



e- Elevate the peritoneum with 2 non toothed forceps, squeeze it between 2 fingers to be sure that there is no viscera & incise the peritoneum (blade is directed upward to avoid injury of caecum)



N.B. The peritoneum is opened first by a small incision to allow access of air to help displacement of viscera downwards & therefore decreases the incidence of injury of these viscera while the peritoneum is opened widely

Advantages:

- 1- Muscle splitting decreases incidence of incisional hernia.
- 2- Direct access to appendix.
- 3- Heals rapidly.

Disadvantages:

1. Direct hernia due to injury of the ilioinguinal nerve.
2. Not exploratory.
3. Its extension (Rutherford Morison's) → muscle cutting.

Lanz incision

Indications:

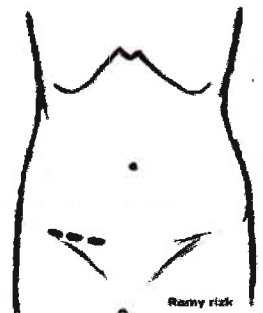
→ Done when cosmosis is highly indicated (e.g. in children).

Incision:

- A transverse incision in the interspinous crease between both ASIS.
- Then grid-iron for the other layers.

Advantages: → More cosmetic.

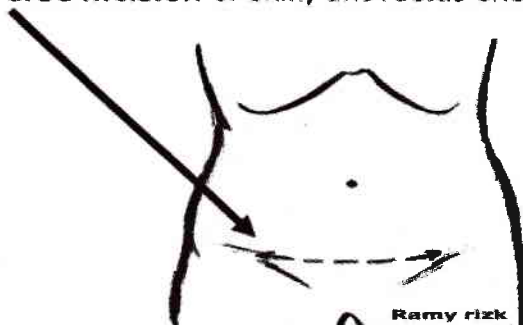
Disadvantage: → Difficult access.



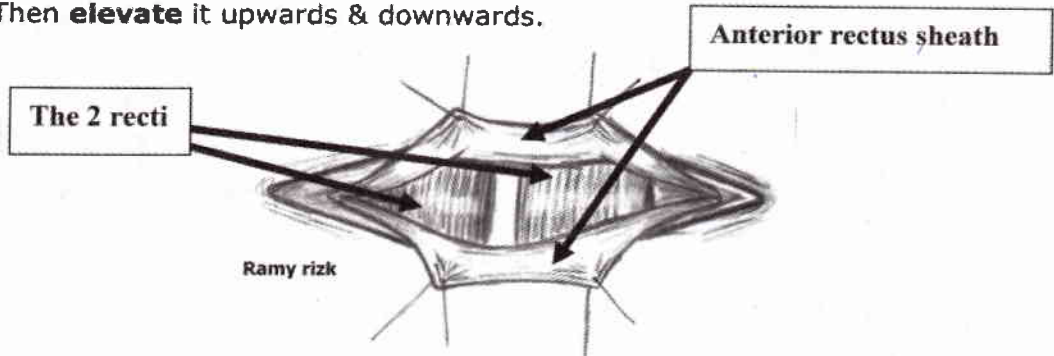
Pfannenstiel incision (= transverse lower abd incision)

Incision:

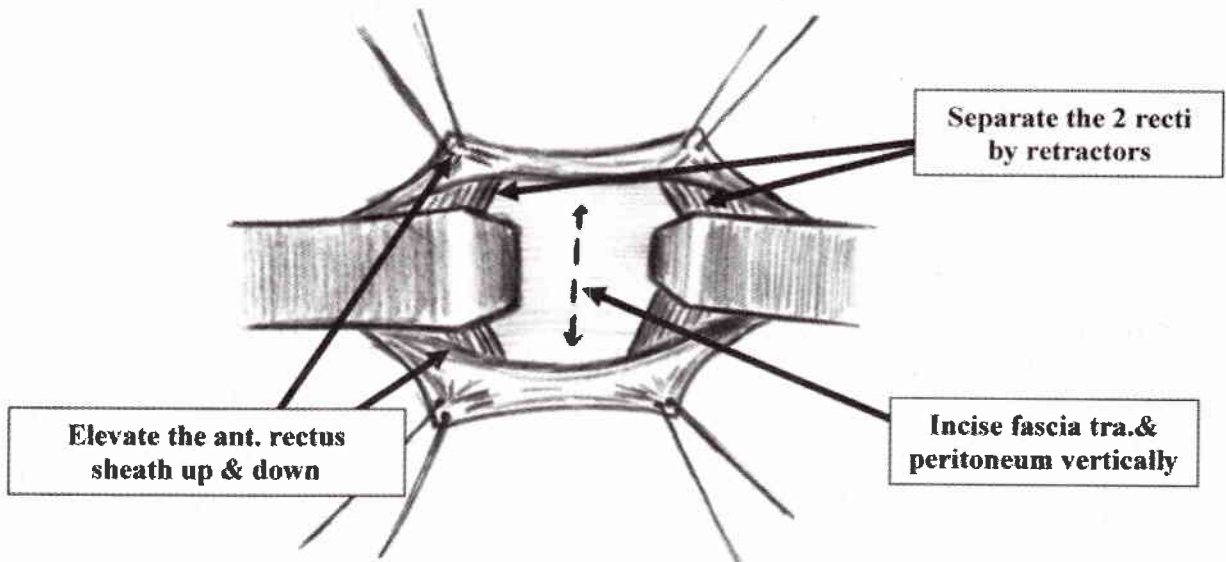
1. A transverse incision of skin, ant rectus sheath on both sides.



2. **Dissect** the ant rectus sheath from the underlying recti.
3. Then **elevate** it upwards & downwards.



4. The recti are **widely separated** apart by retractors or fingers (no post rectus sheath).
5. **Incise** fascia transversalis & peritoneum in a vertical direction.



N.B. For exposure of urinary bladder: fascia transv. & peritoneum are not opened but swept upwards.

possible oral questions

- 1- -indications, structures incised, advantages and disadvantages of:
 - midline incision
 - Paramedian incision
 - subcostal incision
 - grid-iron incision
 - Lanz incision
 - Pfannenstiel incision
- 2- -healing by primary and secondary incision
- 3- -complications of abdominal incision
- 4- -Burst abdomen: causes and management

Appendicectomy

Indications:

- 1- Acute non-complicated appendicitis.
- 2- After resolution of appendicular mass by 3 ms.
- 3- After drainage of appendicular abscess by 6 ms.
- 4- Recurrent subacute appendicitis.
- 5- Appendicular tumor (Argentaffin cell tumor) Carcinoid tumor.
 - If less than 1.5 cm → Appendicectomy is always done.
 - If more than 1.5 cm → Rt. Hemoicolectomy is done.
- 6- Others → mucocele, diverticulae & fistula of appendix.

Contraindications:

- Appendicular mass. ttt: (Oschner-Sherren Regimen).
- Appendicular abscess. ttt: (Extra-peritoneal drainage).
- Crohn's disease affecting the caecum.

Anesthesia

- **General anesthesia.**
- **Spinal if there is bad general condition**, as omental or peritoneal traction is painful.
- **Local.**

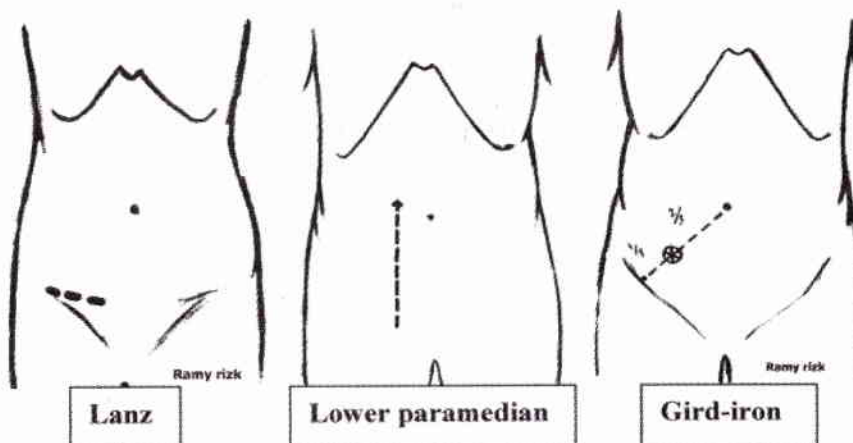


N.B.

1st steps is, examination under anesthesia (relaxation of abdominal muscles)
If mass is found → awaken the patient & start Oschner Sherren treatment.

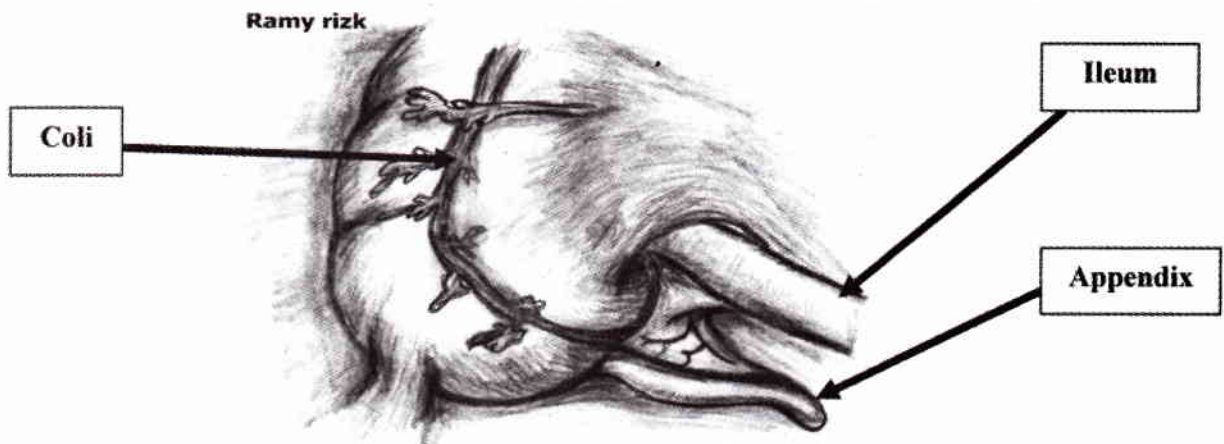
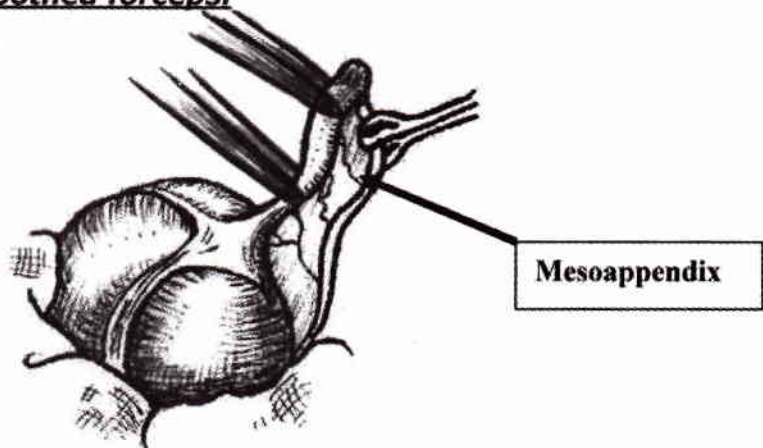
Steps:

- 1- **Position** → supine.
- 2- **Skin preparation:**
 - Betadine from umbilicus to mid-thigh.
 - Tincture iodine is **better to be avoided** in the scrotum
- 2- **Incisions:**
 - Grid-iron incision (most commonly used).
 - Lanz incision.
 - Lower Rt paramedian (if peritonitis or doubtful diagnosis).



3- Procedure:**1) Identify the coecum =**

- Has taenia coli in its wall.
- Blind.
- Faint blue in color.
- Fixed in its place (≠ The crowding small intestine).

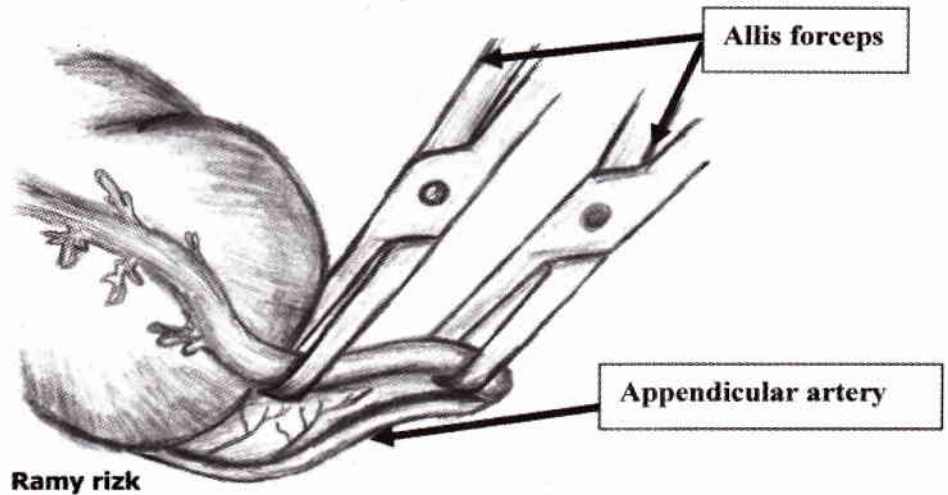
**2) Deliver the coecum gently into the wound by finger, gauze or non-toothed forceps.****3) Identify the appendix =**

- Follow the taenia coli convergence towards the appendix.
- The base is at 2.5 cm from iliocaecal junction.

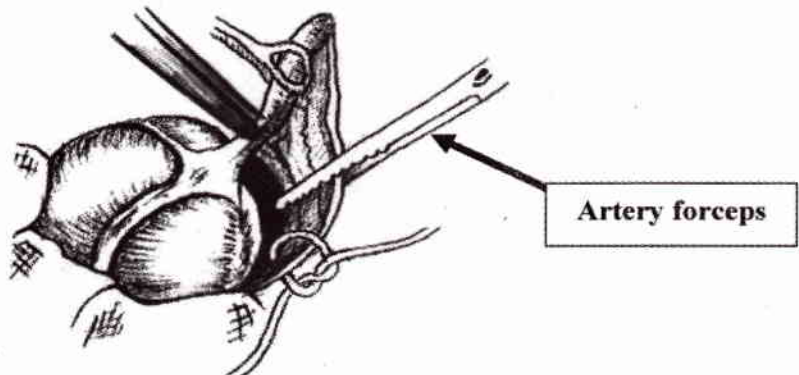
N.B. Signs of inflamed appendix:

- 1- Peritoneal reaction (serous fluid or pus).
- 2- Presence of omentum at the wound.

4) Hold the appendix by 2 Allis forceps:

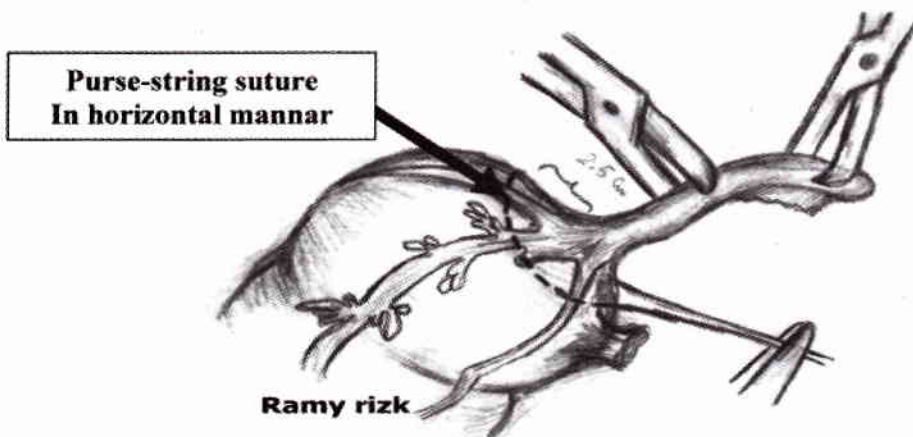


5) Place artery forceps across the mesoappendix:



6) Ligate the vessels:

7) Divide the mesoappendix:



8) Place a purse-string suture at the base of the cecum:

- 2 cm from the base of the appendix.
- In the Tinea coli (because it is avascular).
- In horizontal manner not vertical.
(= seromuscular not reaching the mucosa)

9) Place crushing (Kocher) forceps at the base of the appendix 3 times:

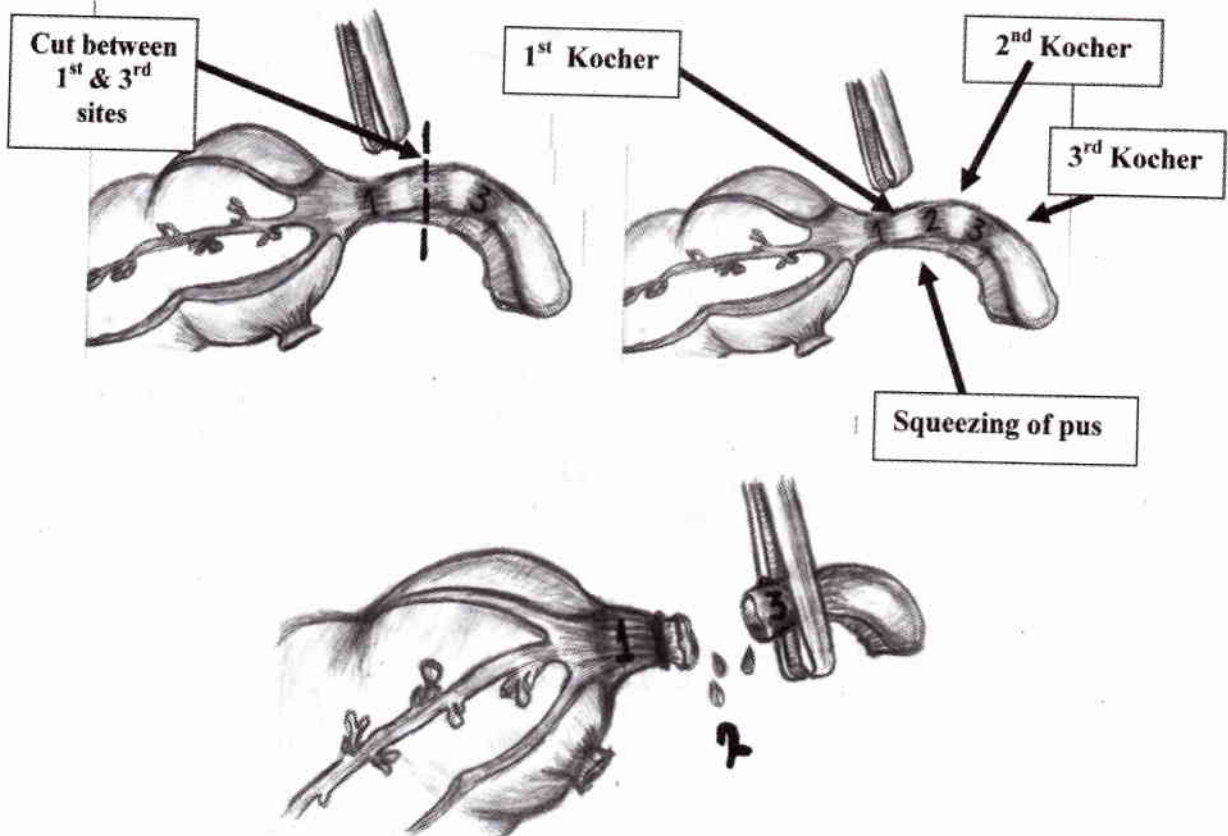
1st (at the base) is for :

- a- Holding ligature at the base with an absorbable ligature.
- b- Hemostatic (obliteration of caecal branches).
- c- Crushing lymphoid follicles.

2nd is for:

- a- Squeezing pus & feces distally (↓ contamination).
- b- Dividing on it.

3rd is for leaving the forceps at it so as not to drop pus.

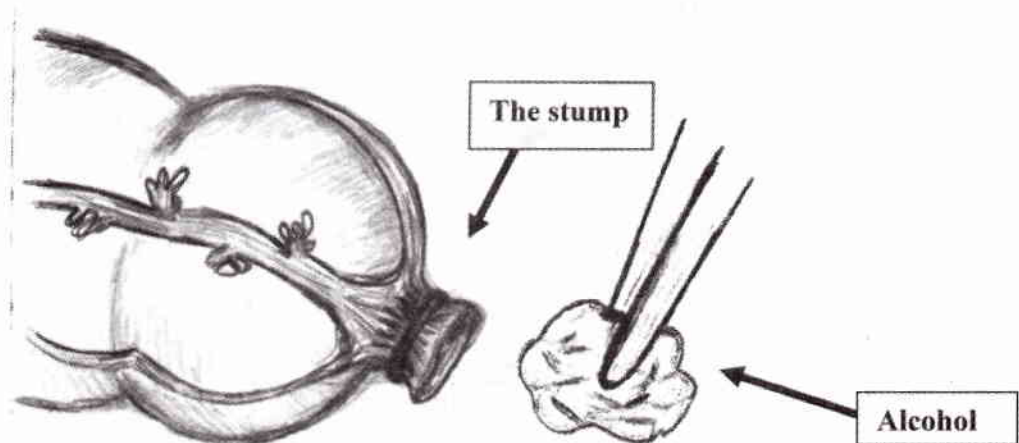


NB: Crushing:

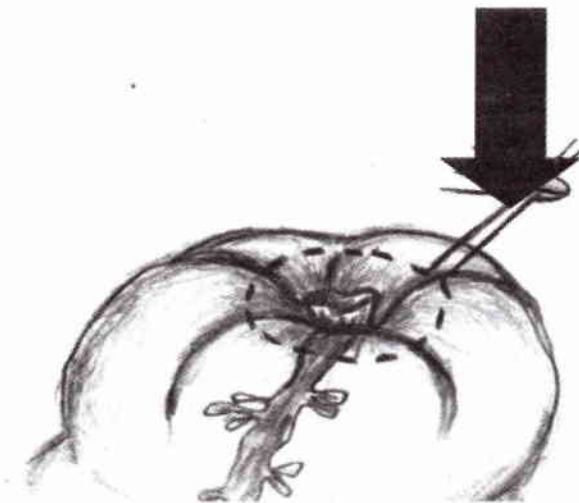
- Promote haemostasis.
- Speeds fibrosis.
- Causes more fixation of the ligature.

10) Send appendix for histopathology (as may be = carcinoid tumor)

11) Paint the stump with alcohol (or cauterize it as it may contain pus)



12) Invaginate the stump in the caecum & tie the purse string around it:



13) Peritoneal toilet for 2 minutes:

(as there may be bleeding from the appendicular vessels).

Problems:

1- The appendix is not inflamed:

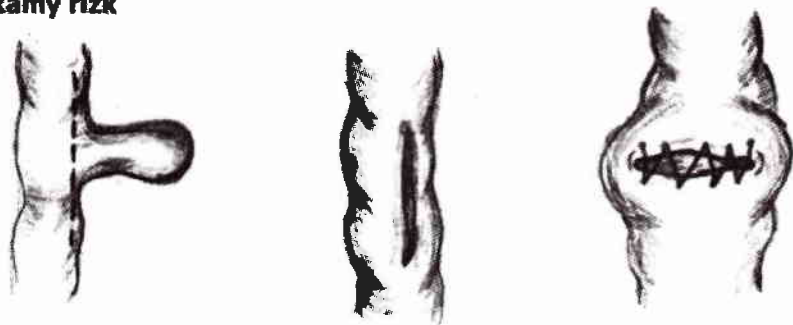
- We should do appendicectomy inspite of normal appendix to exclude it later on from the DD of pain in Rt. iliac fossa.
- Search for the cause.

a- Rt tubo-ovarian pathology
(e.g. ruptured ovarian cyst or disturbed ectopic pregnancy).

b- Inflamed Meckel's diverticulum:

- Localized resection from the base + close in a transverse manner. Or:
- Resection & anastomosis.

Ramy rizk

c- **Perforated peptic ulcer :**

- Upper midline incision.
- Put a drain from the incision of the appendicectomy.

d- **Crohn's disease**

- If inflamed terminal ileum only → appendicectomy.
- If affecting the coecum → contraindicated to do append. (To avoid fecal fistula).



N.B. If we accidentally find a normal Meckel's diverticulum by the way:

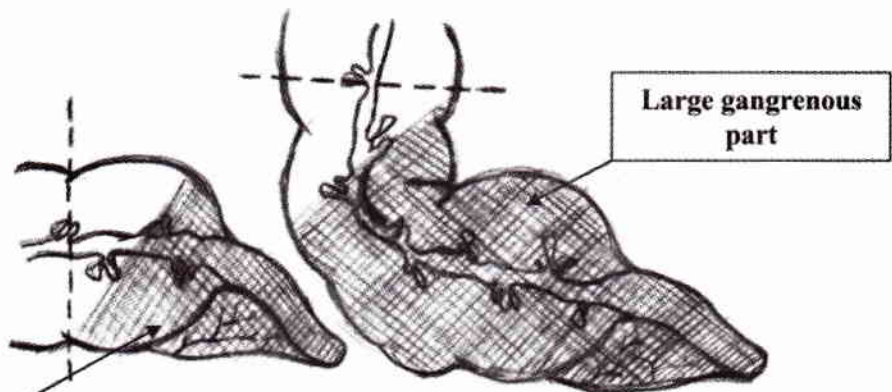
- young pt → Remove
- Old pt → Leave & give report .

2- **The appendicular base is markedly inflamed:**

→ Don't do crushing.

3- **coecum is inflamed (typhlitis)** → Omit purse string suture4- **The coecum is gangrenous:**

- **if small part** is gangrenous: remove the gangrenous part + close in 2 layers.
- **if large part** is gangrenous: limited Rt hemicolectomy .

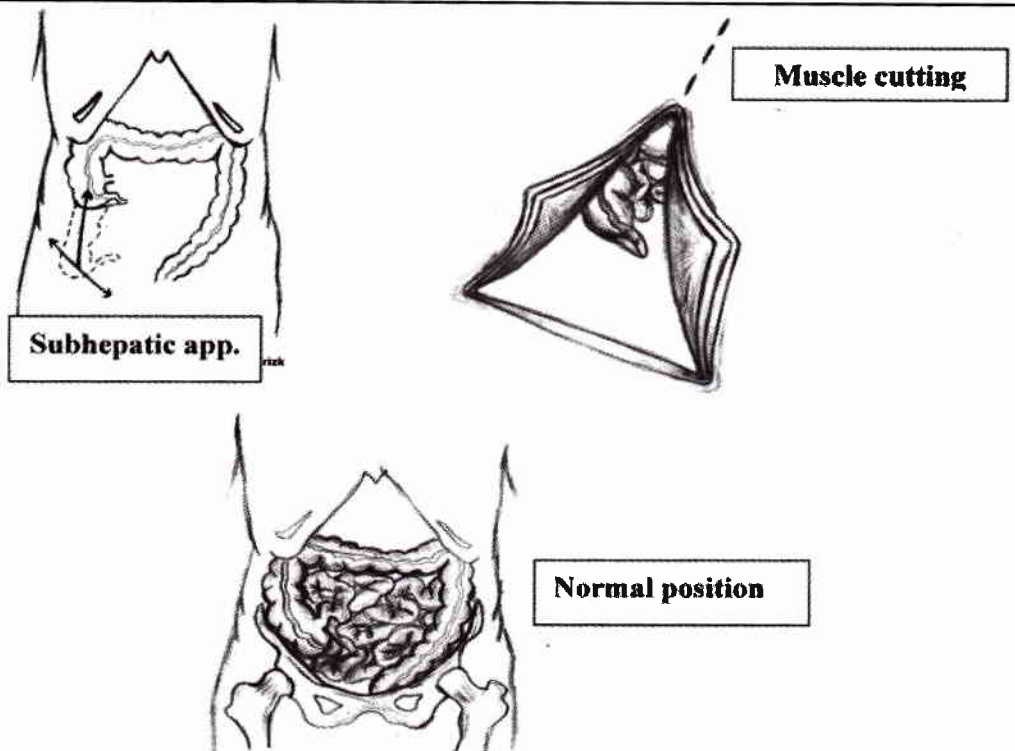


Small gangrenous part

Ramy rizk

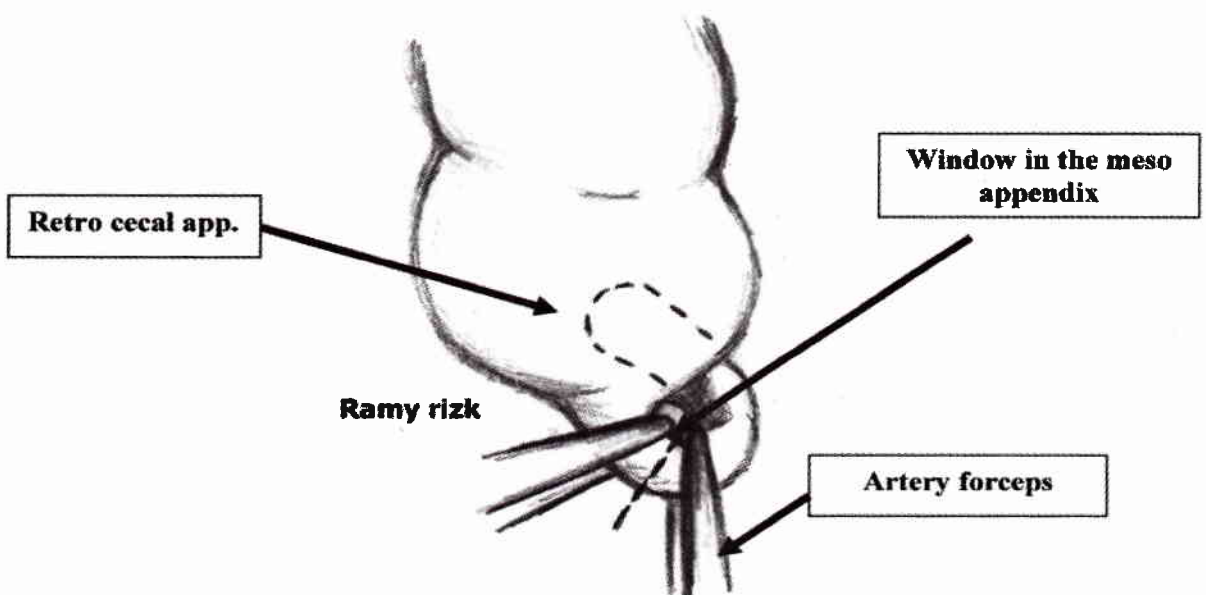
5- **If the iliac fossa is empty = subhepatic appendix**

→ Muscle cutting incision, **rectus abdominis muscle cutting**
Ratherford muscle cutting extension



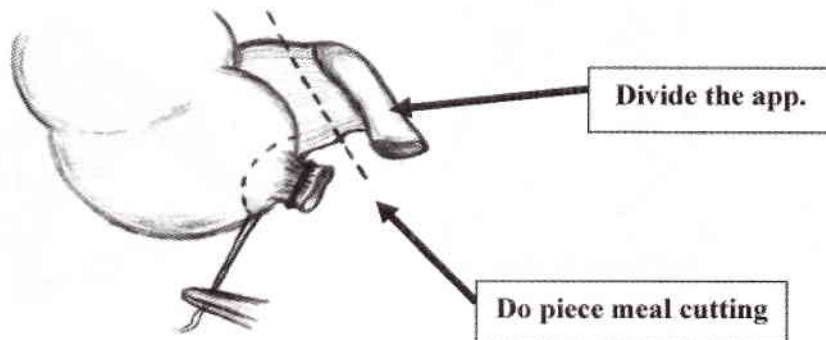
N.B. We avoid injury of deep circumflex iliac artery (from ext. iliac artery) & of ilioinguinal nerve

- 6- **If the tip of the appendix is not accessible?**
(Base is more accessible than tip)(e.g. Retrocecal appendix).



- Apply 2 artery forceps to the base of the appendix through a window in the mesoappendix (5 mm apart).

- Divide the appendix between the 2 art forceps:



- Ligate the base & do purse string & invaginate the stump.
- Do piece meal cutting of the mesoappendix from base to tip. (Retrograde appendectomy).

Complications:

Early:

- Paralytic ileus (The most common).
- Infection: peritonitis – wound – pelvic or subphrenic abscess.
- Hemorrhage (1ry haemorrhage from mesoappendix).
- Portal pyaemia.
- Faecal fistula: either due to misdiagnosis, caecal wall necrosis or iatrogenic.

Late:

- Adhesions (small intestine obstruction).

Post operative treatment:

1. Observe vital data: passage of flatus or audible intestinal sounds.
2. Analgesics: Narcotics.
3. Fluids: 500cc glucose/ 6hrs, 500cc Ringer/ 8hrs, 500cc Saline/ 24hrs.
4. Antibiotics: especially with gangrenous appendix, peritonitis or anaerobic infections. Give combination of: Penicillin (for G+ve), Aminoglycosides (for G-ve) & Flagyl (for anaerobs).
5. Remove the drain (if present), when stops draining.
6. Remove stitches after 7 – 10 days.

Possible oral questions

- 1- Complications of acute appendicitis , why it is common in infants and old people
- 2- Typical and atypical presentations of acute appendicitis
- 3- How to manage :appendicular mass , appendicular abscess??
- 4- Different positions of appendix
- 5- Importance of examination under anaesthesia?
- 6- Advantages and disadvantages of: grid iron incision, rt lower paramedian incision
- 7- How to identify cecum, appendix
- 8- Importance of crushing the base of the appendix by 3 Kocher forceps
- 9- What will you do if:
 - The appendix is not inflamed
 - Caecum is inflamed

► References:

- B. & L. → 70 : 1208.
- Anderson, Kallehave (2002) (<http://www.cochrane.org>)
- Berry, J. and Malt, American journal of surgery 2000 (567:75).
- Blomquist, P.G, Anderson, Annals of Surgery 233:455-60.
- Rothvock, S.G and Pagane J.P (2000), Annals of Emergency Medicine 36:39-51

Gallbladder Operations Cholecystectomy

* Types:

Conventional (open), Mini.Lap. (Transrectal) or Laparoscopic.

Open Cholecystectomy

I- Indications:

- 1- **Chronic calcular cholecystitis or C.C.C. (the most common).**
- 2- **Gall stones :**
 - a- **Symptomitized.**
 - b- **Non symptomitized if :**
 - * **> 2 cm**
 - * **Diabetic**
 - * **Non functioning G.B.**
 - * **calcified G.B.**
- 3- **Acute calcular cholecystitis:**
 - During first 48 hrs with experienced surgeon.
 - 3 weeks after resolution of the acute attack.
- 4- **Chronic non-calcular cholecystitis after failure of the medical Treatment** & the gall bladder is non functioning.
- 5- **Empyema & Mucocele** of the gall bladder (complicating C.C.C.).
- 6- **Torsion, Traumatic perforation, Tumors.**
- 7- **Volvolus G.B. (with mesentry).**
- 8- **Typhoid carrier in G.B.**
- 9- **Operable carcinoma in G.B. (With wedge live resection).**
- 10- **Cholesterolosis of G.B.**

II- Contraindication:

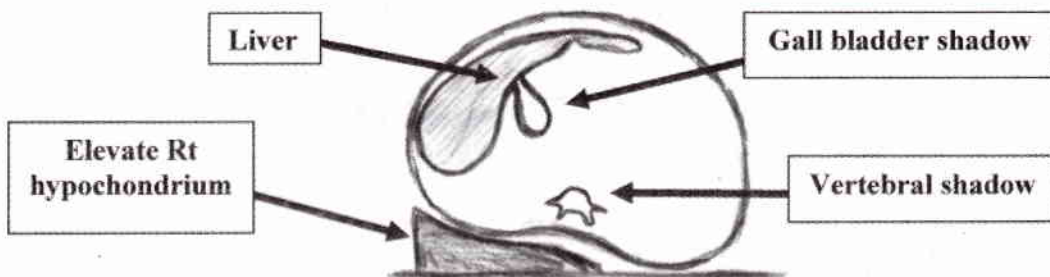
Acute cholecystitis.

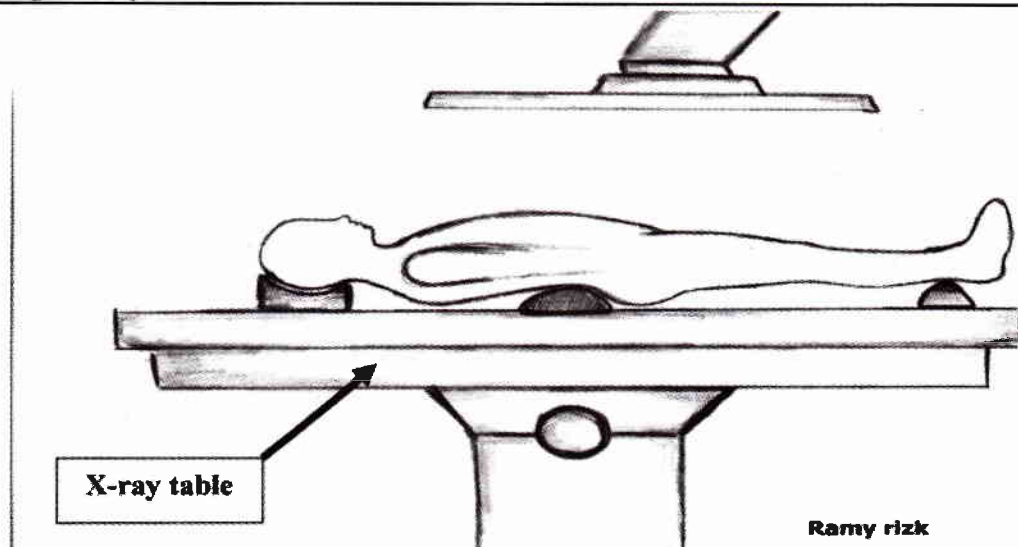
III- Anesthesia: → General anesthesia.

IV- Steps:

1- Position:

- Supine.
- On an X-ray operating table.
- Elevate the Rt hypochondrium 15° [to avoid overlapping of the dye in the GB (white) with the vertebrae (white) during performing cholangiogram.





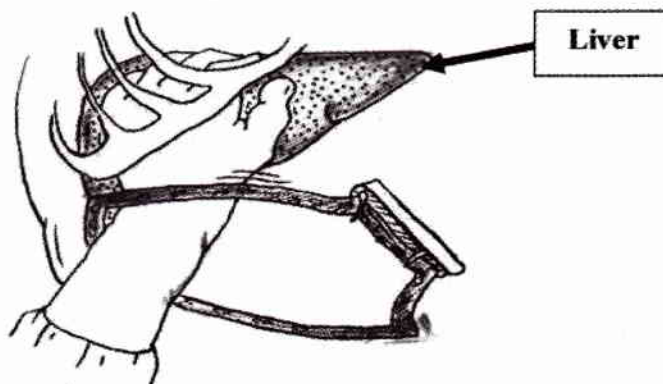
2- Skin preparation:

3- Incision:

1. Kocher incision.
2. Rt upper paramedian (in Wilkie's, Saint's triad, in emergency or in narrow subcostal angle).
3. Transverse incision: over the rectus sheath only

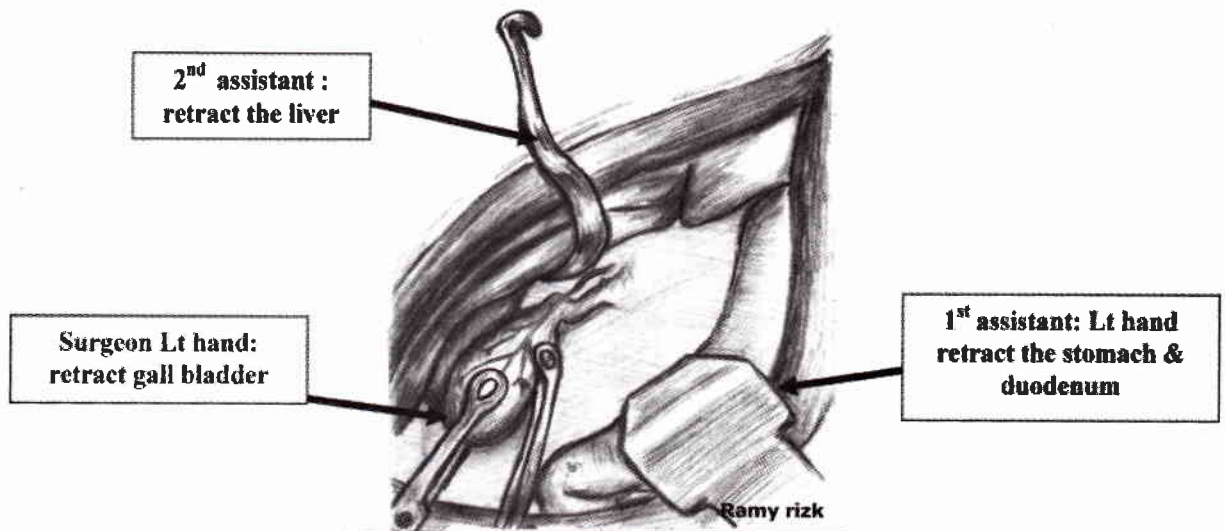
4- Procedure:

1. **1st of all:** full laparotomy to exclude associated Saint's triad or Wilkie's triad, this is done if the incision is midline or Rt. paramedian.
2. Introduce your hand between the liver & diaphragm to displace the liver slightly below the costal margin -by allowing air entry at this space- ; this brings the GB in the center of the field.

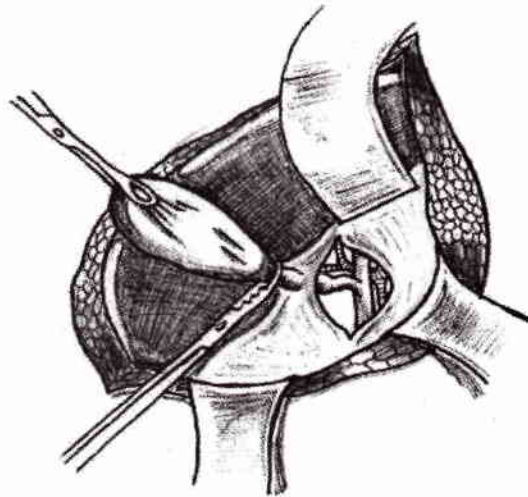


3. Widen the field by:

- a- **Assistant 1 (Lt. hand):** retract the stomach to the left & duodenum & transverse colon downwards.
- b- **Assistant 2:** retract the lower border of the liver upwards by Diever retractor.
- c- **Surgeon (Lt. hand):** retract the GB laterally by two GB clamps one for Hartman pouch & and the other for the fundus.

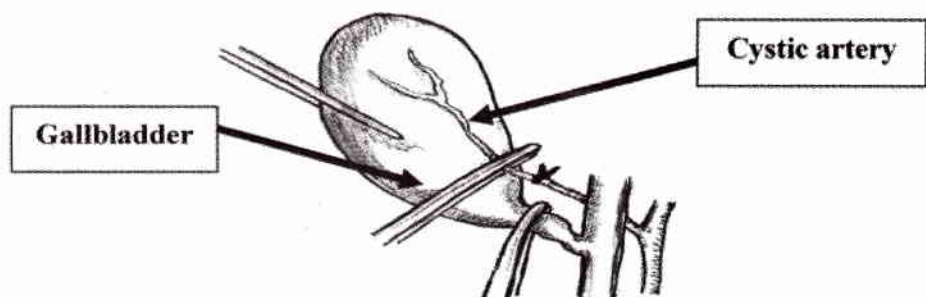


4. Incise the peritoneum at the neck of the GB to expose triangle of calot



What are the boundaries??

5. Dissect the triangle of Calot to expose the cystic artery.
6. Ligate & divide the cystic artery using right angle clamp because:
- It's fixing the duct.
 - To avoid its injury during removal of G.B.
 - To render the operation avascular.



NB: If you find *large cystic artery*, take care as it may be the Rt hepatic artery not the cystic artery (Caterpillar anomaly) so we may:

- Continue its dissection → to see it going to the liver but giving a smaller branch which is the cystic artery giving branches in the GB.
- Fundus 1st method (**retrograde method**) = search the cystic artery at the gall bladder surface.



N.B.

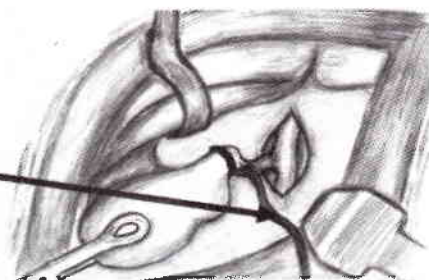
- If Rt hepatic artery is ligated, give the pt post operative Ab to avoid septic infarction, but the infarction is rare as both liver lobes are communicating & taking blood also from the portal v.

If the cystic artery is injured we may:

- Compress it for few minutes then ligate it or.
- Pringle/s maneuver is done.

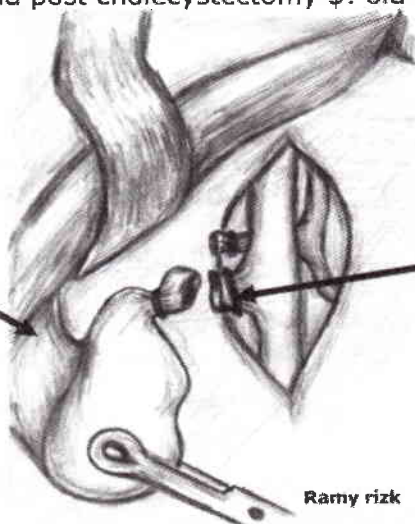
7. Ligate the cystic duct using absorbable cat gut towards the G.B to avoid slipped stone → cannulate it → & perform intra operative Cholangiogram.

Cannulate the duct



8. Ligate the cystic duct with another ligature, towards C.B.D.
9. Divide the duct & leave a small stump.
(to avoid post cholecystectomy χ : old theory)

Divide the peritoneal reflection



Stump

Ramy rizk

10. Divide the peritoneal reflection between the GB & the liver.
11. Dissect the GB out of its hepatic bed.
12. Send GB to histopathology.

5- Closure:

- 1- Absolute haemostasis = check the cystic artery & GB bed.
- 2- Place a drain into the GB bed.



N.B. *There may be cholecystohepatic ducts (= abnormal communication between liver & GB) that can leak bile (to avoid biliary peritonitis)*

3- Close in layers:

- Skin: using interrupted silk.
- Anterior rectus sheath + External oblique.
- Posterior rectus sheath + Transversus abdominis + Internal O.
- Peritoneum: using continuous cat gut.

**N.B.**

- *We don't close rectus muscle because of its tendinous intersection & its segmental nerve supply.*
- *If you found a mass & you weren't able to perform cholecystectomy:*
 1. Open the fundus.
 2. Remove the stone.
 3. Then insert Malecot or Folly tube + purse string sutures = (cholecystostomy)
 4. After 3 wks cholecystectomy is done.

V- Complications:**1- Primary hemorrhage: (due to injury of cystic artery):**

- Pringle's maneuver.
- Compression of hepatic artery at the free border of lesser omentum between left index (in foramen of Winslow) & left thumb (over the free border of lesser omentum).

2- Injury of important structures:

- a- CHD or CBD → stricture → obstructive jaundice.
- b- Accidental ligation of hepatic a.
- c- Injury of duodenum → repair in two layers + NG suction.

3- Postcholecystectomy jaundice:

- a- Missed stone in CBD.
- b- Stricture or ligation of CBD.
- c- Liver cell failure (due to ligation of hepatic a.).
- d- Incompatible blood transfusion
- e- Viral Hepatitis.
- f- Halothane toxicity.

4- Postcholecystectomy syndrome: Persistence of symptoms post operatively.

- a- Stricture of CBD.
- b- Missed stone in CBD.
- c- Long cystic duct stump (only if contains a stone).
- d- Biliary dyskinesia.
- e- Wrong diagnosis: e.g. Duodenal ulcer.

5- Subphrenic collection.

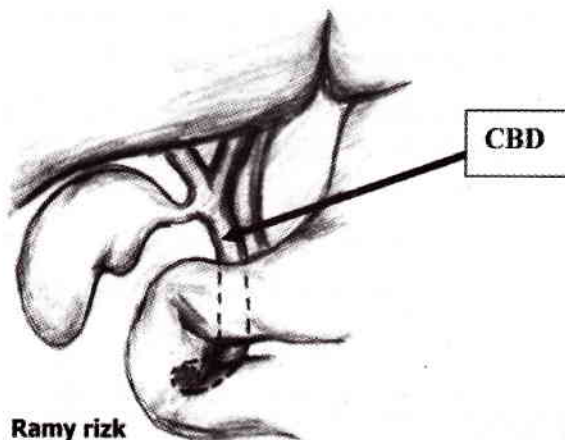
Choledocolithotomy & Exploration of CBD

I- Indications:

Preoperative:

1. History of jaundice.
2. Abnormal liver function ($\uparrow$ alkaline phosphatase).
3. Charcot's triad (pain, fever, jaundice).
4. Dilated CBD or CBD stones demonstrated by U/S, ERCP & PTC.

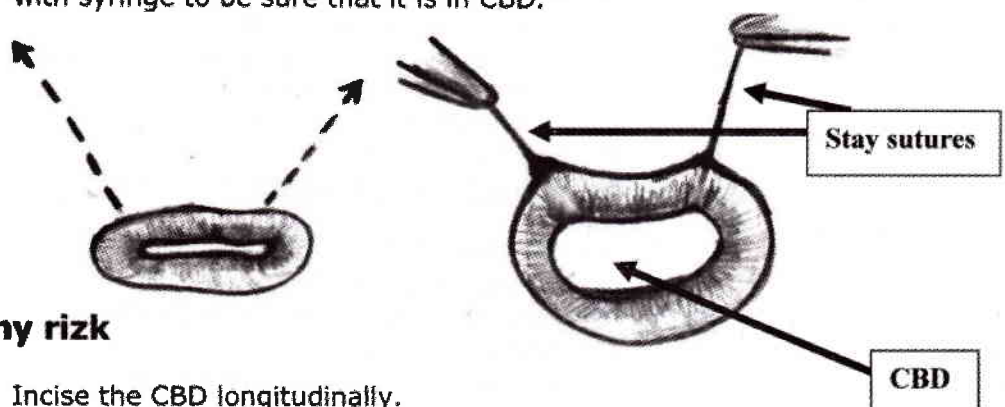
Intraoperative:



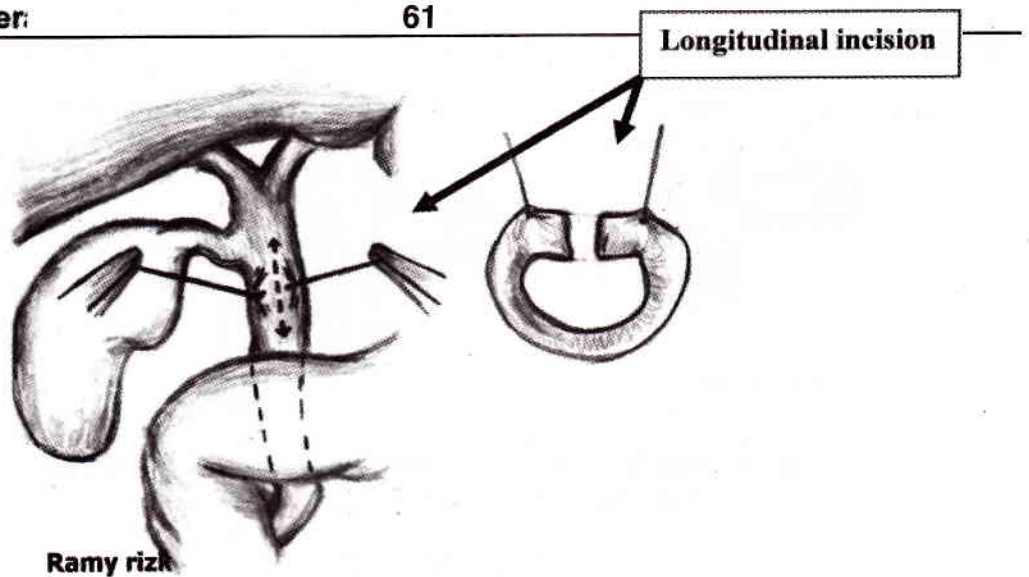
1. Dilated CBD > 12 mm.
2. Palpation of stone in CBD.
3. Single faceted stone.

II- Procedure:

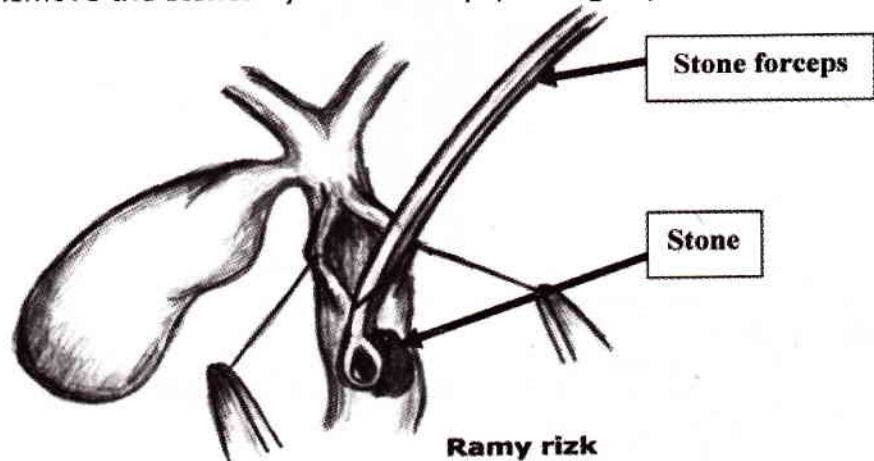
1. Place 2 stay sutures on either side of the supraduodenal CBD aspirate with syringe to be sure that it is in CBD.



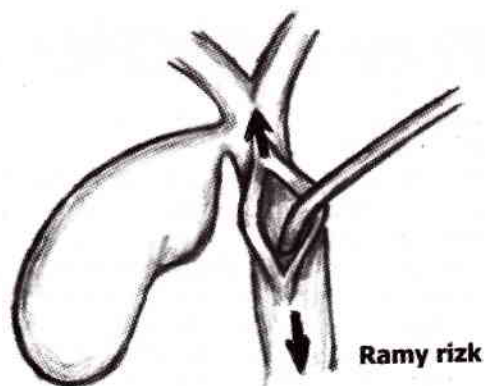
2. Incise the CBD longitudinally.



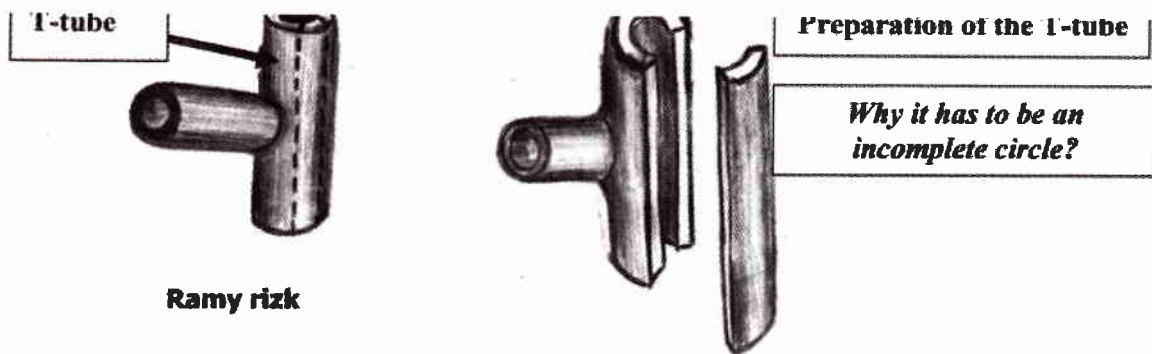
3. Remove the stones by stone forceps, or Fogarty's catheter.



4. Inspect the CBD by choledocoscope.

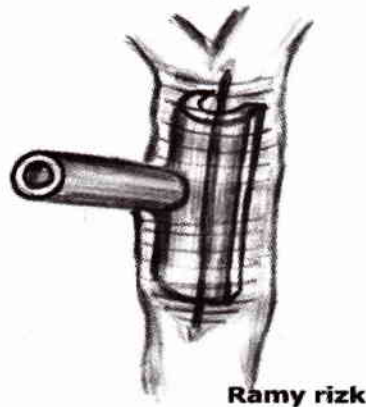


5. Place a T-tube; inject dye (Intraoperative cholangiography if possible).



If intraoperative cholangiography is not possible →

6. Close the CBD over a T-tube.



7. Cholangiogram after 10 days is done.

III- Complications:

1- Intraoperative:

→ Accidental ligation of the CBD or hepatic artery.

2- Post-operative:

→ Early:

- Biliary leak.
- Wound infection, septicemia.
- Jaundice, retained stone.

→ Late: → Biliary stricture.

Possible oral questions

- 1- Anatomy of triangle of calot?
- 2- What is caterpillar anomaly?
- 3- What is saint & wilkie's triad?
- 4- Advantages of: early cholecystectomy ,conservative ttt?
- 5- Why acut appendicitis is treated by surgery while acute cholecystitis may be treated conservatively?
- 6- What do you know about fundus 1st cholecystectomy?
- 7- Indications of exploring common bile duct during cholecystectomy?
- 8- How do you manage hge from cystic artery or rt. Hepatic artery?
- 9- Causes of post-cholecystectomy syndrome?
- 10- Causes of post-cholecystectomy jaundice?

► References:

- B. & L. → 65 : 1113.
- Caver, D.C, Russell (96) Chapman & Hall, London.
- Sherlock, S. and Dooley J. (eds) (2001), 11th edition, Oxford.
- Blumgavt, L.H. and Fong, Y. (eds) (2000), London.

Splenectomy

I- Indications:

A- Absolute:

1- Trauma:

- If splenic preservation of no value.
- Search for an associated Lt renal injury.
- In children if severe trauma with huge spleen → splenectomy & re-implantation of a part of the spleen.

2- Blood diseases:

- i. Thalassemia
- ii. Hereditary spherocytosis.
- iii. ITP.

3- Wandering symptomatic spleen.

4- Aneurysm of splenic artery -If ligation will cut splenic blood flow.

5- Cysts, abscess & tumors of spleen.

B- Relative:

1. Bilharzial splenomegaly (alone or with Hassab's operation) IF:

- Manifested hypersplenism.
- Splenic vein thrombosis.
- Huge spleen -Mechanical disability.

2. Acquired hemolytic anemia.

3. Left sectorial portal hypertension.

4. Gaucher's disease.

5. Staging laparotomy: → Hodgkin's lymphoma to avoid

- Hypersplenism.
- Radiation induced nephritis of left kidney.

6. Part of an other operation:

- portal hypertension.
- Cancer of the stomach & pancreas.

II- Preoperative preparation: according to indication:

- Trauma → Resuscitate (antishock measures, Ryle's tube) & Monitor.
- Blood diseases → check Hb, WBCs, platelets.
- Platelet concentrate in ITP (Preoperative & after ligation of splenic artery)
- Portal hypertension → check PT, serum protein, other liver functions (Child's classification).
- **Elective splenectomy** → Correct anaemia, hyporalbuminaemia... etc., Treat chest infections -as It's an upper abdominal operation, Ryle's tube (Pre-, Intra- & Postoperatively).
- Long acting penicillin & pneumo vaccine immunization

III- Anesthesia:

→ General anesthesia

IV- Steps:

1. Position: → Supine.

2. Skin preparation:

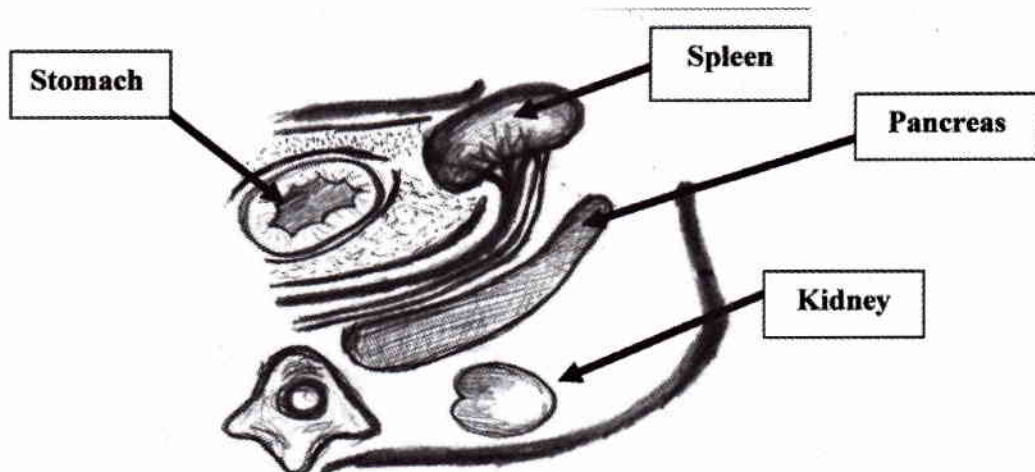
3. Incision:

- 1) Upper abdominal midline incision (In Trauma).
- 2) Upper abdominal Left paramedian incision. (Classic one)
- 3) Lt subcostal incision. (Especially for Bilharzial spleen -adhesions)

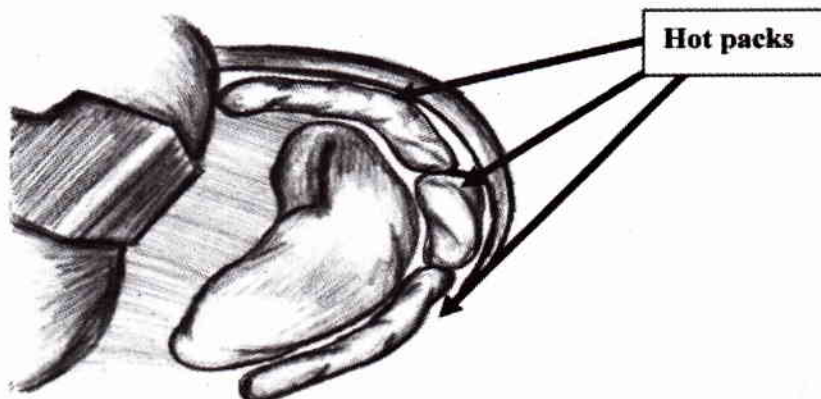
- 4) Thoraco-abdominal incision (in case of perisplenitis: due to presence of portosystemic anastomosis, where blunt spleen dissection carries the risk of intraperitoneal hge)

4. Procedure:

- 1) Place the **Right** hand on the lateral surface of spleen & pull it medially



- 2) Deliver the spleen into the wound by placing hot packs between the spleen & the diaphragm.

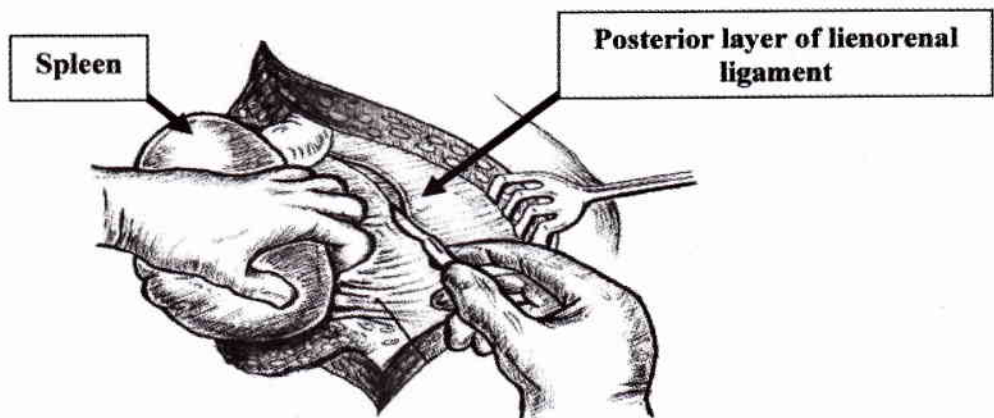




N.B. Importance of hot packs:

- 1- Support of diaphragm
- 2- Control minor bleeding from splenic bed
- 3- Keep spleen in wound (preventing its fall in abdomen)

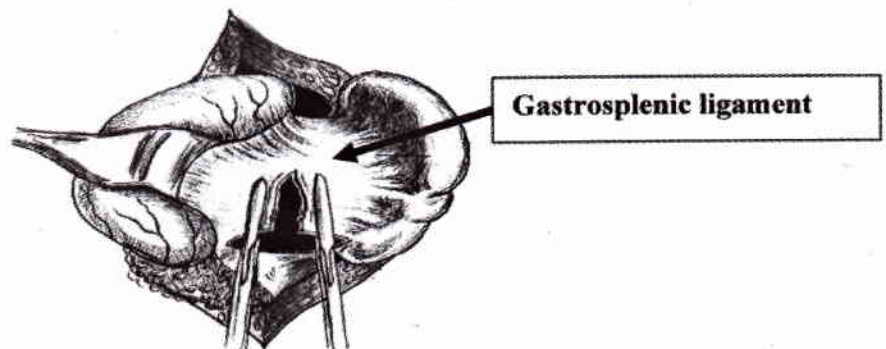
- 3) After the spleen is drawn medially, divide the posterior layer of the lienorenal ligament.



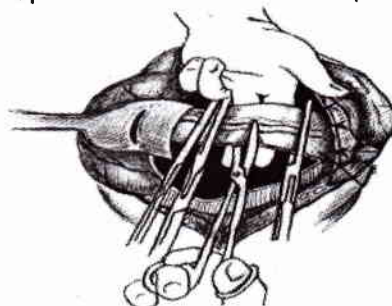
- 4) Ligate & divide the gastrosplenic ligament.

(Containing short gastric & left gastroepiploic vessels) why?

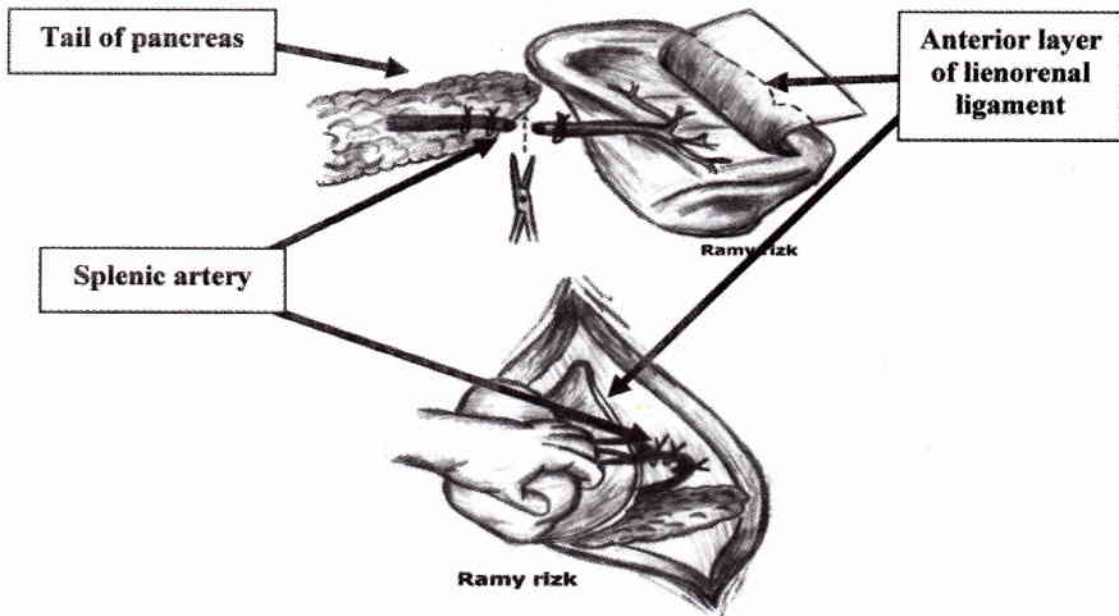
- To fully deliver the posterior pole of spleen.
- Open lesser sac to expose the anterior layer of lieno-renal ligament containing splenic vessels & pancreatic tail.
- If bleeding occurred (common), Ligation of short gastric vessels in hurry may injure the stomach.



- 5) Divide the anterior layer of the lienorenal ligament.
(to expose splenic vessels & tail of pancreas)



- 6) Separate the tail of pancreas from the vessels (gently) then ligate & divide the splenic artery



- 7) Devascularization: But you should first test the tensile power of the thread.
- **Mass ligation:** i.e. ligation of the artery & vein together.
 - * Disadvantages: → A.V. fistula.
 - Slipped ligature.
 - **Individual ligation:** i.e. ligation of the artery & the vein separately.
 - Use silk or better Vicryl.
 - Use 3 ligatures.
 - Divide between the distal 2 ligatures.
 - We can use 3 splenic pedicle clamps & divide between distal 2 & replace the proximal 2 clamps by ligatures.
 - After ligation of the artery, squeeze the spleen (autotransfusion) & infuse platelets in I.T.P.
 - **Selective ligation:**
 - Splenic vessels' branches are cut between artery forceps & then ligated.



- 8) Complete splenectomy by dividing the residual peritoneal attachment to colon & stomach
- 10) Complete laparotomy especially of the biliary tree: i.e.
 - To exclude other injuries (**in trauma**).
 - To remove other splenules in the greater omentum or stones. (**in hemolytic anemia**)

5. Closure:

- 1) Absolute haemostasis.
- 2) Place a drain (if large spleen).
- 3) Close in layers.

IV:- Post operative treatment:

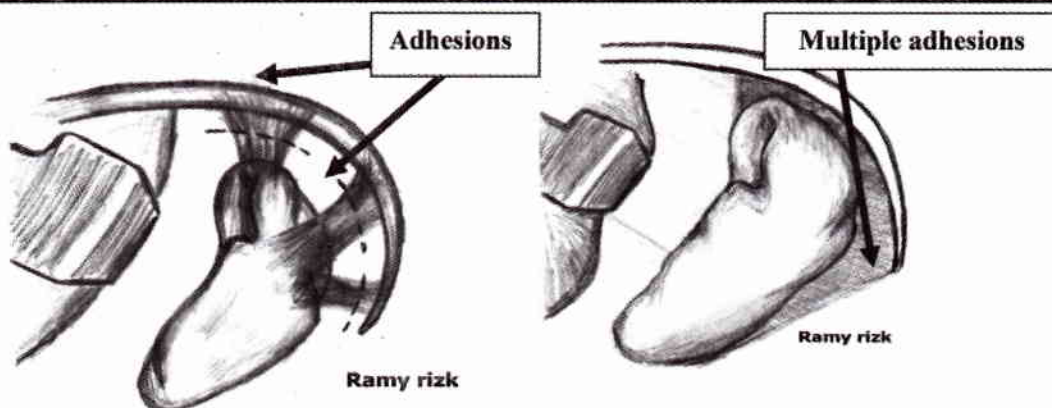
- Ryle's tube.
- Antibiotics.
- Remove drain after 2-3 days & stitches after 10 days.
- I.V. fluids.

N.B.

In Perisplenitis, adhesions & portosystemic anastomosis occur Blunt spleen dissection carries the risk of intraperitoneal Hge.

- If there are 2 or 3 adhesions, ligate and divide them.
- If there are marked adhesions:
 1. Do thoraco-abdominal incision & ligation of the adhesions under vision.
 2. Leave them and close the abdomen.
 3. Ligate the pedicle & wait for auto-infarction of the spleen.

In trauma: suck out all free blood clots.



V:- Complications

A- Operative:

- 1- **1ry hemorrhage**
- 2- **Injury of** → stomach, tail of pancreas & diaphragm

B- Postoperative:

Early

1. **Reactionary hemorrhage** due to slipped sutures or hypertension.
2. **Hematemesis.**
(Ligation of short gastric a. → congestion of submucosal fundic varices)
3. **Burst abdomen** (5-7th day) due to:
 - Injury of the tail of pancreas.
 - Hypoproteinemia.
 - Abdominal distension.

4. Gastric perforation.
5. Pancreatic fistula.
6. Subphrenic collection.
7. Acute gastric dilatation.
8. Chest infection.

Late

- 1) **Postsplenectomy overwhelming sepsis:**
(→ Give penicillin & pneumococcal vaccine).
- 2) **Thrombocytosis (& Portal vein thrombosis):**
(→ Give baby aspirin).
- 3) **Splenosis** (implantation of scattered splenic tissue).

Possible oral questions

- 1- Anatomy of the spleen?
- 2- Peritoneal attachment of the spleen?
- 3- Indications of splenectomy?
- 4- Preoperative preparations of splenectomy?
- 5- How do you manage stap in left hypochondrium?
- 6- Mention techniques for splenic preservation?
- 7- Complications of splenectomy?
- 8- Causes of splenomegaly, huge spleen?

► References:

- B. & L. → 64 : 11034-93.
- Glasgow, R.E. and Mulvihill (99), World Journal of Surgery 23 (23:384-8).
- Weatherall, D.J (97). British Medical Journal 341:492-496.
- British Medical Journal 312:430-4.
- <http://www.ssat.com/guidlines/spleen7.htm>.
- <http://www.scotland.gov.uk/health/cmobulletetin/hb591.09.asp>

Anal Operations: Lay Open Track for Anal Fistula

I- Indication: → Low fistula.

II- Preoperative preparation:

- **2 enemas:**

- One in the day before the surgery.
- One in the day of the surgery.

- **3 distances:**

- PR.
- Proctoscope.
- Sigmoidoscope.

- **4 fingers:**

- Dilate the anus by 1 finger on each side then 2, 3, 4, till the resistance gives away.

III- Anesthesia: → General or spinal anesthesia.

IV- Steps:

1- Position: → Lithotomy position.

2- Skin preparation.

3- Procedure:

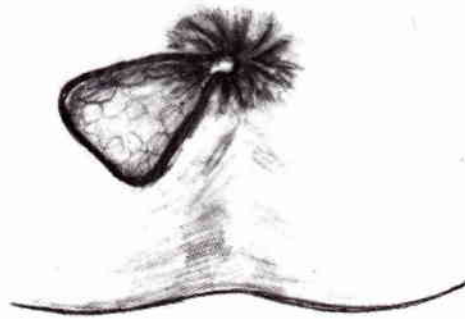
- a- Pass a probe from the fistula opening of the fistula towards the anal canal.



b- The track is slit-opened along its length.



- c- A triangular area of perineal skin & adjacent mucosa is removed leaving a raw area to heal by granulation.



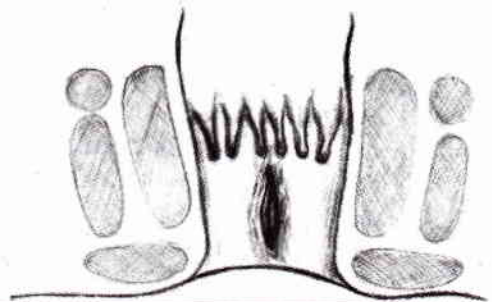
Fissurectomy

I- Indication: → Chronic anal fissure

II, III, IV: → 1, 2: → As lay open.

3- Procedure:

- a- If the anal sphincter is still narrow perform sphincterectomy by incising the internal sphincter

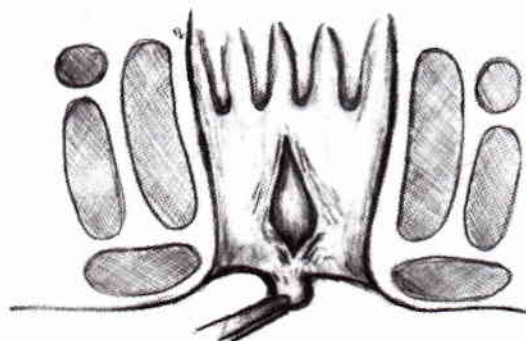


N.B.

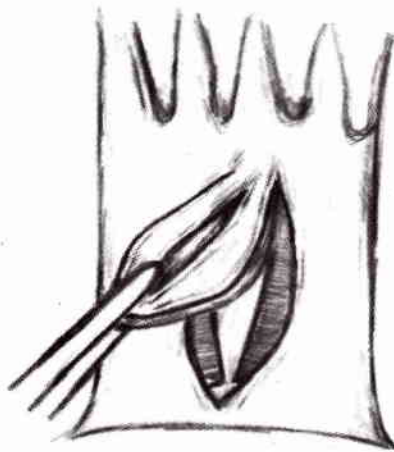
- Incise only 2 cm of the sphincter which is 4 cm.
- Incise the sphincter at the lateral or the post side but lat. is better
- Why lateral is better??
- How to differentiate the internal sphincter from the two of external sphincters??

- b- Two light tissue forceps are placed on the mucocutaneous junction to each side of the fissure.

- c- They are drawn downwards until the fissure comes into view.



- d- With the knife, the fissure & its fibrous tissue are excised by elliptical incision.



- e- Give analgesics, laxatives post operatively till healing.

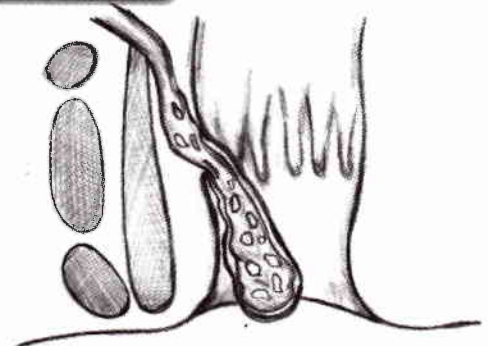
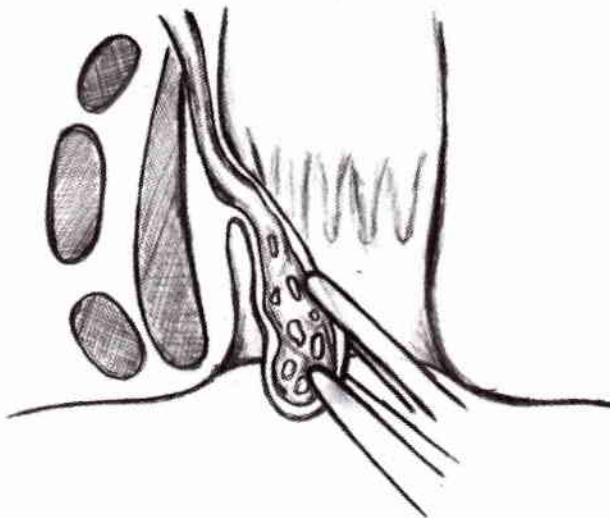
Haemorrhoidectomy

I- Indication: → 4th degree piles.

II, III, IV → 1, 2: → As lay open.

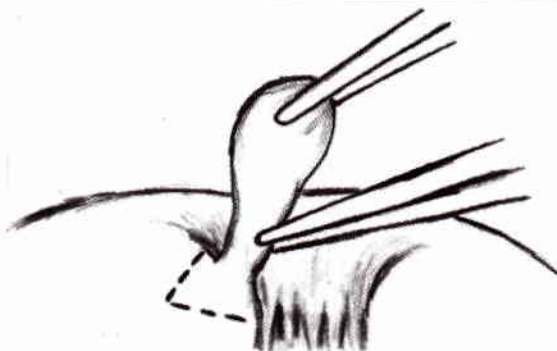
3- Procedure:

- 1) The haemorrhoid is fixed by Allis, artery forceps.



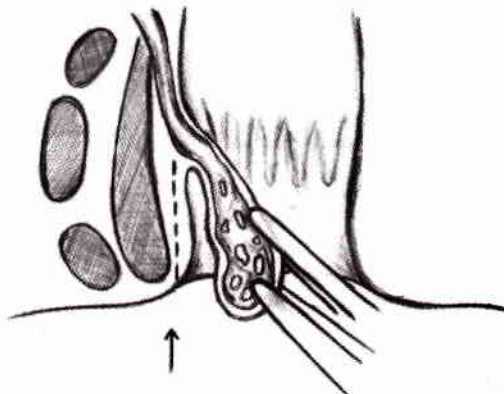
- 2) V-shaped incision is done in the:

- Skin.
- Corrugator cutis ani muscle.
- Mucous membrane.

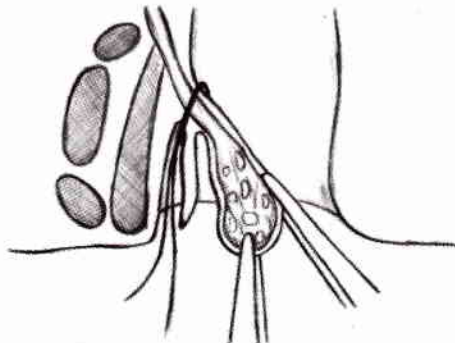


N.B. Cut the skin less than the m.m. as rate of growth of skin is less than that of the mucous membrane so that the skin into mucous membrane.

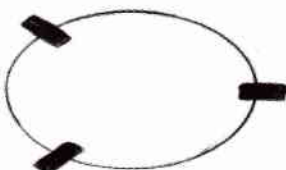
- 3) Push the internal sphincter lateral till the pedicle.



- 4) Transfix & ligate the pedicle of the haemorrhoid with a silk suture leaving a long length of the suture material attached.

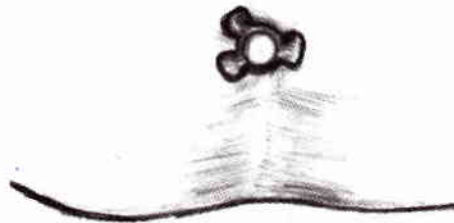


- 5) Excise the haemorrhoid 0.5 cm distal to the ligature.
6) Repeat the procedure for the haemorrhoids at 7 O'clock then 3 then 11 (to keep the field as clear from blood as possible).





N.B. Leave a mucocutaneous bridge between each haemorrhoid to prevent any subsequent stricture.



- 7) Place a small paraffin soaked pack (to ↓ bleeding in the canal).
- 8) Encourage bowel action with adequate analgesia & laxative.
- 9) At the 5th post-operative day, do digital rectal examination to exclude anal stenosis.

V- Complications:

Early:

- Hge:
 - Reactionary.
 - Secondary (treated by packing).
- Acute urinary retention (due to reflex spasm of external urethral sphincter, don't rush for catheter).
- Constipation (due to pain during defecation).

Late:

- Anal stenosis.
- Recurrence.
- Incontinence with sphincter damage.

VI- Contraindications:

- i. 1st & 2nd degree piles. (Treatment is conservative).
- ii. Open pulmonary T.B. sinus.
- iii. 2ry piles.

Possible oral questions

- 1- Anatomy of the anal canal?
- 2- D.D of painful anal conditions?
- 3- Conservative ttt of acute fissure?
- 4- Importance of PR examination in piles?
- 5- Complications of internal piles?
- 6- Treatment options of internal piles?
- 7- Classification of :
 - Anorectal abscess
 - Anal fistula
- 8- Why lateral sphenterectomy is better than the posterior one?
- 9- Importance of mucocutaneous bridge between each haemorrhoids

► References:

- B. & L. → 72 : 1242/1241.
- Fielding, L.P and Goldberg, S. (eds) (99) 2nd edition, London

Kidney Operations

Exposure of the kidney:-

- 1- Lumbar approach.
- 2- Transabdominal (anterior) approach.
- 3- Vertical laparotomy.

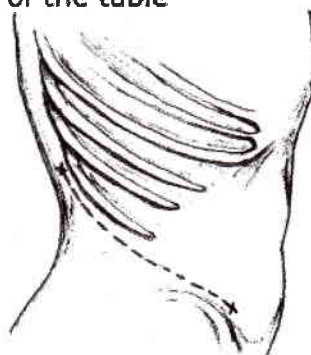
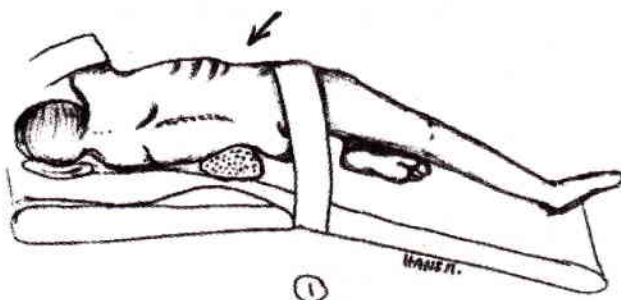
1. Lumbar approach:

1- Anesthesia: → General or high spinal.

2- Steps:

1- Position:

- **The patient:** lies on the **healthy side** with:
 1. Flexing leg of the healthy side (to Prevent rolling of the patient)
 2. Extending the leg of the diseased side **(1)**
 3. With the back close top the edge of the table



N.B.



- Position is maintained by sand bag in front of the patient or special binder over the buttocks.
- For good exposure we extend the leg of the same side.
- **The table:** the middle of the table is raised up to open the space between the ribs & the iliac crest (loin).
- The arm on the diseased side is supported on a lever (open the loin for incision - prevent rotation - decrease pressure on the chest).

- **The Surgeon:** stands facing the patient back.

2- **Sterilization & toweling.**

3- **Incision:**

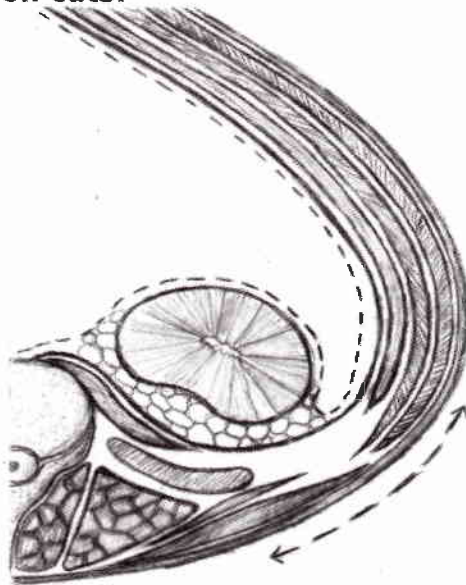
→ **Morris (lumbar) incision:**

N.B. Immediately before incision look at patient X-ray to make sure of the site and position of stone and any abnormality of the last rib.

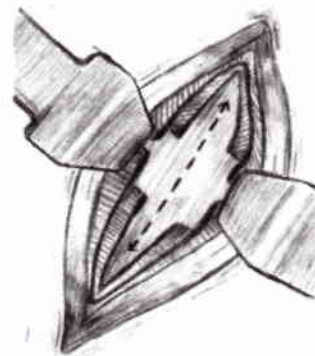
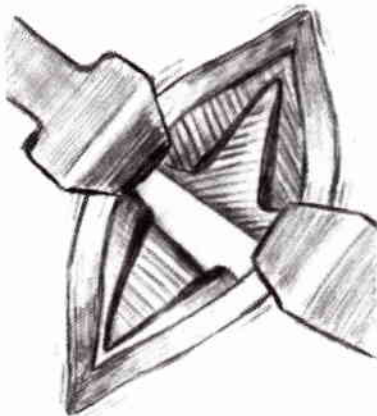
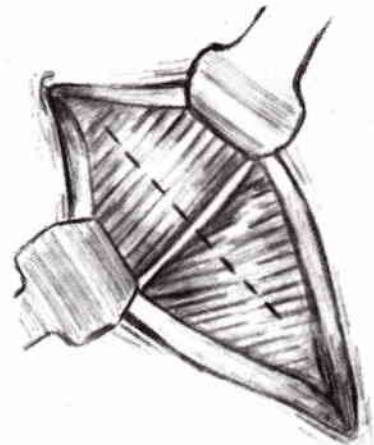
- a. Starts just below the renal angle (= junction of the last rib with lat border of sacro-spinalis ms) → to avoid injury of pleural recess (2)
- b. & passes downwards & forwards to about 1" above the ASIS.

N.B. The 12th rib may be resected through the incision to give good exposure especially if the kidney is large & the loin is narrow

c. The incision cuts:



- Skin, superf. fascia, deep fascia.
- + in the post. 1/2: (3 muscles).
 - Latissimus dorsi muscle.
 - Serratus post inferior muscle.
 - Quadratus lumborum muscle.
- + in the ant 1/2: (3 muscles.)
 - External oblique muscle.
 - Internal oblique muscle.
 - Transversus abdominus muscle.



- d. The last rib can be removed (subperiosteal) if the kidney is big.
- e. Peritoneum is peeled anteriorly (gauze) from the kidney to expose para-renal fat.
- f. The ZuckerKerkandl fascia is incised between 2 artery forceps & the kidney is exposed by blunt (finger) dissection from the surrounding peri-nephric fat.

4- Closure:

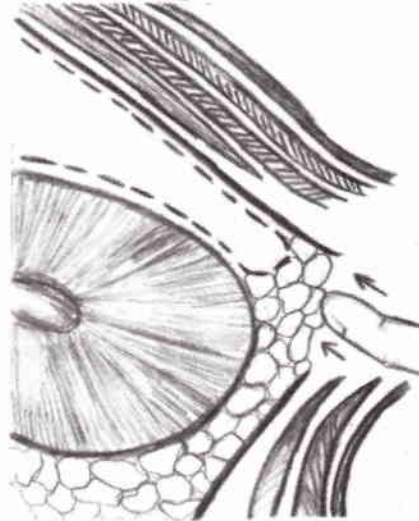
- 1- Lower the bridge of the tables.
- 2- Close in layers with chromic cat gut or better prolene.

5- Advantages:

- 1- Direct exposure.
- 2- It is extra-peritoneal approach (no paralytic ileus).

6- Disadvantages:

- 1- Limited exposure.
- 2- Not suitable for large renal masses.

**2. Transabdominal (anterior) approach:****Indications: (4T)**

- 1- Renal Tumors (In hypernephroma → as we ligate renal vessels 1st).
- 2- Too large kidney.
- 3- Renal Trauma (for associated injuries - as spleen - & intraperitoneal rupture kidney).
- 4- Renal T.B. (→ Nephroureterectomy).

3. Vertical lumpectomy: (Very recent)

- In thin patient.
- Experienced surgeon.

Nephrectomy

Indications: (only if the other kidney is healthy)

- Advanced hydronephrosis (to prevent hypertension).
- Advanced pyonephrosis.
- Renal tumors.
- Renal TB.
- Renal stones (complicated with):
 - o Hydronephrosis.
 - o Pyonephrosis.
 - o Squamous cell carcinoma.
- Rupture kidney.
- Large bipolar renal cysts.

Contraindications:

- Bad general condition.
- When the other kidney is absent or with poor function.

1- Anesthesia: → general or high spinal.

2- Incision: → **Morris (lumbar) incision:**

3- Procedure:

1- Devascularization:

- By gentle gauze stripping expose renal pedicle anterior & posterior (ant...vein → artery → pelvis (post.) V.A.P).

Ligation is done as follows:

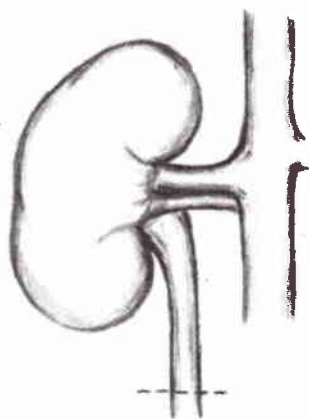
A- Mass ligation: done if the pedicle is short or obscured (adhesions).

B- Individual ligation:

- Artery then the vein are ligated separately.
- Artery 1st to decrease congestion.
- Advantages:
 - ↓ Incidence of slipped ligature whether 1 or 2 of renal vessels are cut between 2 renal pedicle clamps or 2 ligature proximally and 1 distally and replaced by ligature

we can use:

- Strong cat gut (3).
- Strong vicryl (best).
- Silk not in T.B or pyonephrosis → sinus.



- Ligation of the ureter.
- Dissect the ureter and ligate it 2 ligatures as low as possible and paint the stump with alcohol.

4- Closure:

- o In layers with drain in the retro-peritoneal.

Complications:

1- 1ry hemorrhage (Slipped ligature):

- From renal vessels (esp. with mass ligation).

(TTT → packing 5 - 10 minutes then control the bleeder a.).

2- Injury of:

a- Peritoneum.

(TTT → close it surgically).

b- Pleura.:

(TTT → suture around tube with under water seal).

c- Duodenum (Rt. nephrectomy) → bile in the wound.

(TTT → closure in 2 layers + drain).

d- IVC (Rt. nephrectomy).

(TTT → packing 10 minutes → catch the tear using Satinsky (IVC) clamp) → vascular suture 5/0

Special problems:**1- Subcapsular nephrectomy:**

- Done in pyonephrosis (adhesions).
- Incise capsule on convex border → dissect the kidney → medial incision (Devascularization).

2- Large hydronephrosis:

- Do purse- string → introduce trocar & cannula → aspiration → ↓ size → with draw the cannula & ligate the purse-string.

3- Radical nephrectomy:

- Done in case of malignancy, we remove the kidney (+) perinephric fat + enlarged L.Ns.

Operations for Urinary Stones

1- Nephrolithotomy

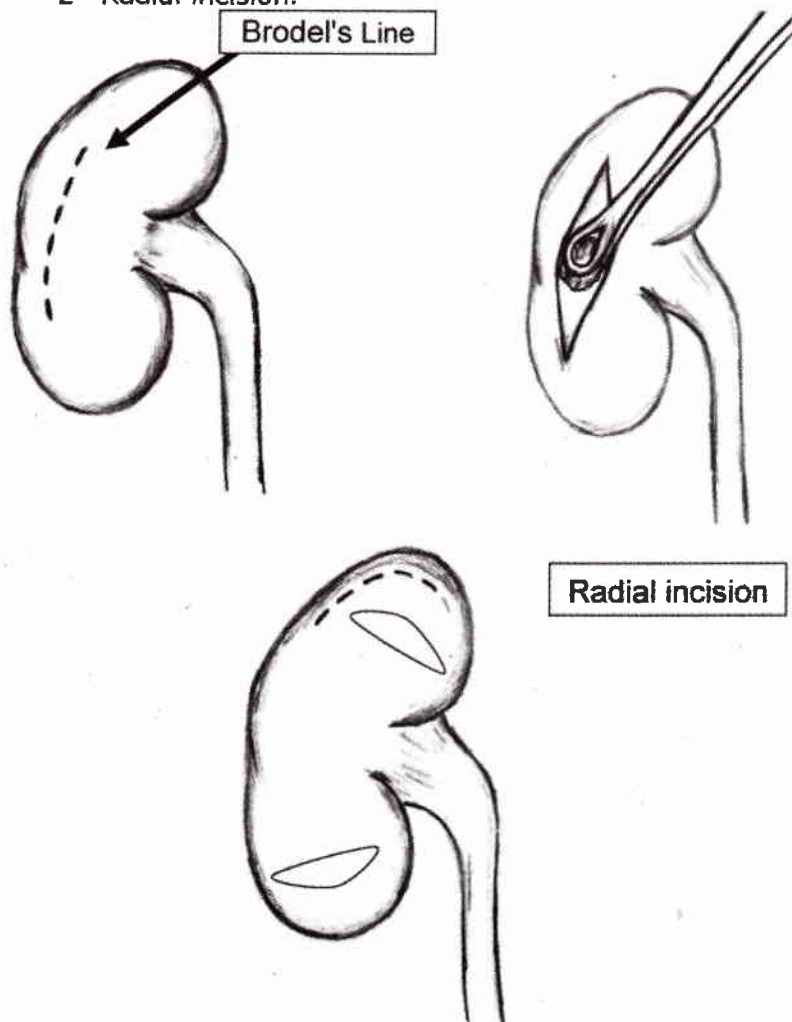
(Stone removal via incision in renal parenchyma)

I- Indications: → A stone impacted in a calyx with wide neck (forcible removal leads to severe bleeding).

II, III 1, 2 → As nephrectomy.

3- Procedure:

- a- The site of the stone is identified by X-ray or palpation of the stone through the kidney substances.
- b- Incision of the kidney to extract the stone by one of the two methods:
 - 1- Longitudinal incision through Brodel's bloodless line.
 - 2- Radial incision.



- c- The stone is removed by nephrolithotomy forceps.

4- Closure:

- As nephrectomy.
- The incision of the kidney is closed by chromic cat gut, U-shaped mattress sutures.

2- Pyelolithotomy

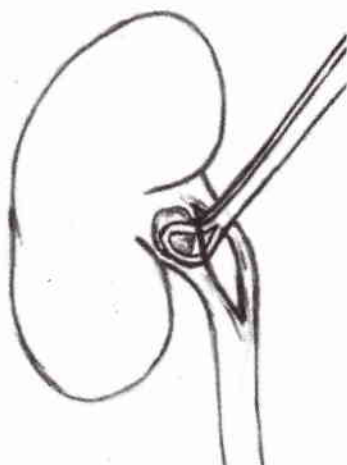
(Removal of a stone via incision in the pelvis)

I- Indications: → For a stone in the pelvis of the kidney.

II-III: → 1, 2 → as nephrectomy.

3- Procedure:

- a- Expose the kidney → reflected medially (to expose the pelvis) → carefully dissected.
- b- Catch the kidney by left hand (thumb post. & other fingers ant.) to fix the stone in pelvis.
- c- Open the renal pelvis (radial incision not crossing P.U.J to avoid strictures & injury of post. descending branch of renal artery) & remove the stone by pyelolithotomy forceps & compare it with the X-ray (don't catch soft tissue).



N.B. It is better to avoid incising the pelvis along its direction with the ureter to prevent extension of the incision to the ureter, so transverse incision may be done.

4- Closure: as nephrectomy (**close with retro-peritoneal drain**)

- If urine is clear:

→ Close the wound in renal pelvis by plain cat gut absorbed after one week.

- If urine is infected:

→ Put a drain beside the pelvis & remove after 4 days.

Advantages (over nephrolithotomy):

- 1- No destruction of renal tissues.
- 2- Less bleeding & rapid healing.

3- Ureterolithotomy

I- Indication: → A stone in the ureter.

II- Anesthesia: → General or high spinal.

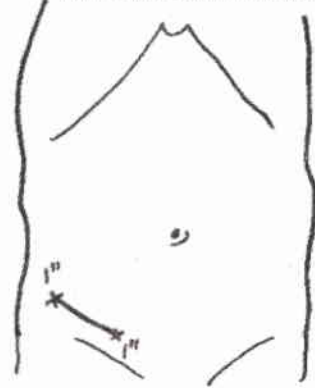
III- Steps:

1- Position:

- As nephrectomy → if the stone is in upper 1/3.
- Supine → if the stone is in the lower 2/3.

2- Incision:

- Upper 1/3: Morris incision.
- Middle 1/3: Abernethy incision (ms cutting by oblique incision) it starts 1" above & medial to A.S.I.S. & extends downwards to 1" above the mid inguinal point (11).
- Lower 1/3: Midline suprapubic incision or Pfannensteil incision.

**3- Procedure:**

- a- Cut all layers:
 - Skin, subcutaneous tissue.
 - Ext oblique, int. oblique, transversus abdominus muscles.
 - b- Push the peritoneum medially → the ureter is seen crossing the bifurcation of the common iliac vessels.
 - c- Suspend the ureter by ring or lanz forceps (to prevent downward slipping of the stone).
 - d- Open the ureter above the site of the stone because:
 - At site of stone there is stricture & inflammation.
 - Above the level there is dilatation & the stricture below prevents its escape.
 - e- Remove the stone by ureterolithotomy forceps.
- 4- Closure:** → as pyelolithotomy.

4- Suprapubic Cystolithotomy

Indication: → Large stone in the bladder.

Anesthesia: → General or spinal.

Steps:

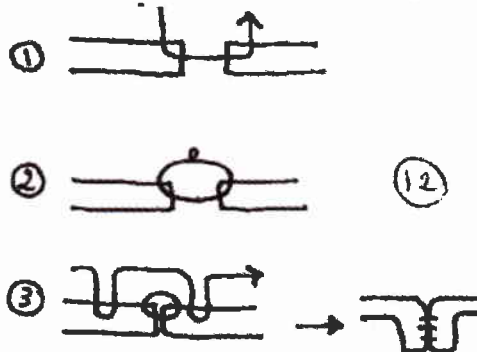
- 1- **Position:** → supine.
- 2- **Incision:**
 - a- Fill the urinary bladder with saline & apply a clamp to the catheter (not routine).
 - b- Midline suprapubic incision (bad cosmesis & causes hernia) or transverse incision (Pfannensteil).
- 3- **Procedure:**
 - a- Push the peritoneum upwards.
 - b- If saline was injected, empty the bladder.
 - c- Apply 2 bladder forceps on the bladder.
 - d- Open the bladder at its center.
 - e- Remove the stone by cystolithotomy forceps.



N.B. Take a look on the inner wall of the bladder, as the stone is precancerous → so if a lesion is found → biopsy.

4- **Closure:**

- Close the bladder without mucosa in 2 layers (all through then inverted lembert) with chromic cat gut. **(12)**
- Put a drain in the retropubic space.
- Put a catheter to avoid extensive pressure.
- Close the wound.



How to identify the ureter?

- Not pulsating.
- But there is peristalsis.
- Not the psoas minor (as it has no lumen but is a flat tendon).
- Not the colon (as the blood supply of the colon is circumferential but of the ureter is longitudinal).
- The ureter passes on the bifurcation of the common iliac artery.
- The stone can be palpated along the ureter's course

How to recognize the bladder?

- Fasciculated appearance.
- Perivesical fat.
- Perivesical venous plexus (large thin veins).
- Inject saline via Foley's catheter → bladder will be distended.
- The stone can be palpated within the bladder.

Complications of kidney operations

A- Operative:

- 1- **Haemorrhage:** 1ry.
- 2- **Injury :** e.g
 - a- Subcostal nerve & vessels.
 - b- Pleura & peritoneum.
 - c- I.V.C & duodenum.

B- Post-operative:

- 1- **Reactionary Hemorrhage:**
 - Slipped ligature either drain Hge. or haematuria (**TTT is exploration & securing**)
- 2- **Sinus formation: dt.**
 - a- F.B. e.g. silk
 - b- Osteomyelitis of the last rib.
- 3- **Urinary fistula:** (Usually due to distal obstruction)
 - a- Stricture.
 - b- Missed stone.
 - c- Bladder neck obstruction.

Possible oral questions

- 1- Sites of ureteric strictures "sites of stone impaction" ?
- 2- Indications of surgical ttt in renal injuries?
- 3- Types and complications of renal stones?
- 4- Treatment options of:
 - Renal stones
 - Ureteric stones
 - Vesical stones
 - Urethral stones
- 5- How can you identify the ureter, bladder intraoperatively?
- 6- Complications of kidney operations?

► References:

- B. & L. → 75:1305/1333.
- Campbell, M.E, Walsh, P.C, (eds) (2002), Philadelphia.
- Tanagho, E.A and McAn.Ch, T.W. (eds) (2000) 15th edition, Newyork

Circumcision

Indications:

A- In infants:

- 1- **R**eligious (commonest).
- 2- **P**himosi*s*.
- 3- **R**ecurrent balanitis.
- 4- Long **p**repuse.

B- In adults:

- 1- Para-phimosi*s* (emergency).
- 2- Balanitis.
- 3- Before radiotherapy (cancer).
- 4- Inability to retract in intercourse.



Contraindications:

- Hypospadias.
- Hemophilia.
- Having bad general condition.

Timing:

- 1st 6 hours after labour (there is excessive maternal clotting factors).
- After 15 days (synthesis of own clotting factors).
- Generally: it is done in the 1st 3 months as the pain perception is not fully developed (low vagal tone)

Advantage:

No smegma (irritant) → ↓ cancer penis & cancer cervix.

Disadvantage:

Fastens the ejaculation → (premature ejaculation).

Preoperative preparation:

- If prothrombin time is low → vit. K every 12 hours IM
- Prevent erection in adults by sedatives.
- Sufficient skin over the penile shaft must be retained to allow an erection without skin tension

Anesthesia:

- Many practitioners now use one of the three available local anesthetic techniques:
 - Topical anesthetic (EMLA) cream.
 - Ring block (local anesthesia) is done by injecting local anesthetic around the bottom of the foreskin near where the incision will be made.
 - Penile block (nerve block) is done by injecting local anesthetic at the base of the penis, where the nerves for pain are located.
- General anesthesia has a lot more risk than local, and isn't necessary for such a short procedure, however in cases > 1 year we may use general anaesthesia.

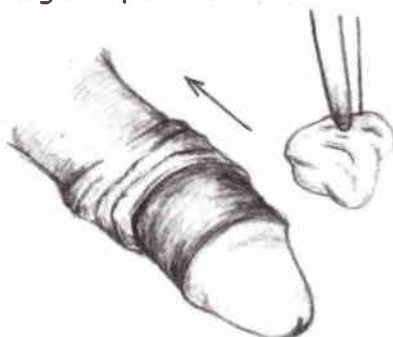


Techniques:**In infants****A) Bone cutting method:**

Applying a bone forceps across the prepuce distal to the glans with blind division is not preferred now (to see one boy with partial or total amputation of the glans is enough to realise the folly of this technique)

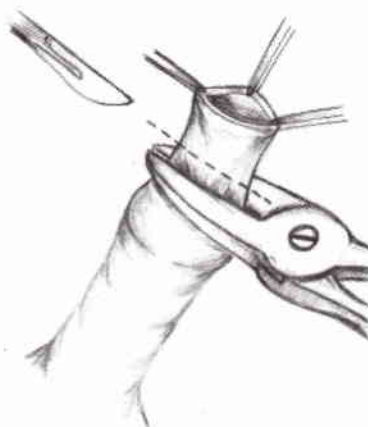
Position → on back with knee flexed & thighs flexed & abducted by an assistant.

- a- Widen the opening of the prepuce.
- b- Reduce the prepuce backwards (to expose postcoronal sulcus).
- c- Remove the smegma by Betadine sponge.
- d- Prepuce is retained to normal position.
- e- Squeeze the glans penis backwards.



N.B.: In fat young children, excessive suprapubic fat may carry abdominal skin over the shaft of the penis so it should be pushed firmly to the pubic symphysis before marking

- f- Apply the bone cutting distal to the glans & maintain for few minutes.



- g- Cut the skin.
- h- Control bleeding by ligation of frenal vessels (if needed).
- i- Cut ends are approximated with fine catgut.
- j- Apply gauze with tincture benzoin around the wound for 24 hrs.
- k- No Ab, simple analgesia is given.

N.B.: Avoid dressing by chemicals to avoid eczema.

Advantages:

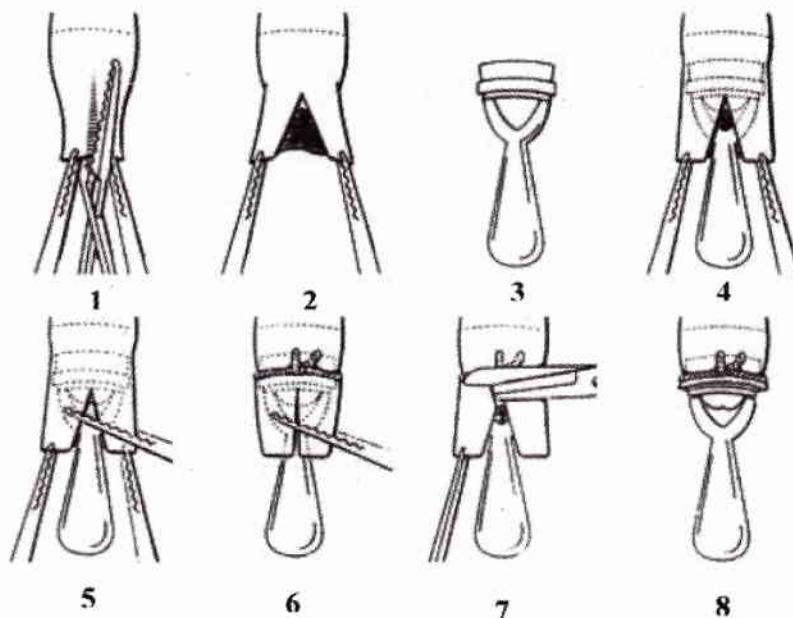
- Rapid.
- Better haemostasis.

Disadvantages:

- Bleeding.
- Under correction.
- Over correction.
- Injury of glans.
- Delayed healing.

B) Plastibell technique (Hollister device):

- The adhesions between glans & foreskin are divided with a probe.
- The foreskin is cut longitudinally to allow it to be retracted & glans to be expose.
- The plastibell is applied to the head & is covered over by foreskin (the plastibell comes in 6 sizes).
- A ligature is tied firmly around the foreskin.
- The excess skin protruding beyond the ring is trimmed of (finally the handle is broken of at the end of procedure).
- The ring falls off in 3 – 7 days leaving a circumferential wound that will heal over the following week.

**Advantages:**

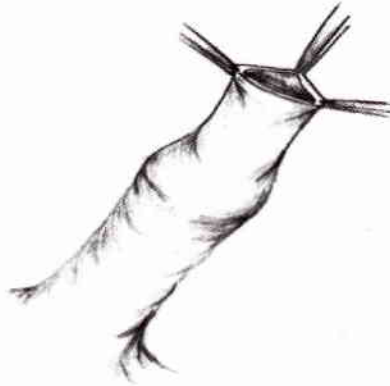
- The glans is protected during this procedure.
- Homeostasis
- Cosmetically → there will be little to no scar
- Quik procedure
- Less discomfort to the baby & no bandage required.

Disadvantages

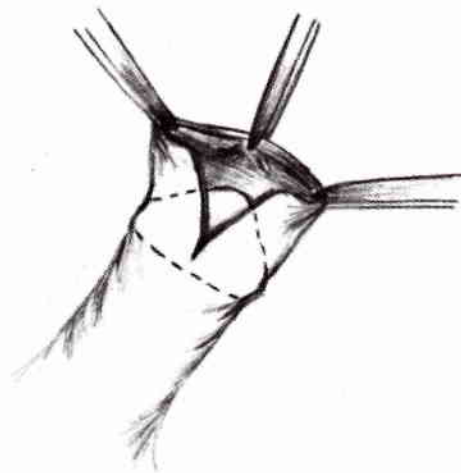
- Rarely the tip of glans may protrude through the ring & become swollen.
- Risks of infection or hemorrhage due to bell slippage.

In adults**Dissection method:**

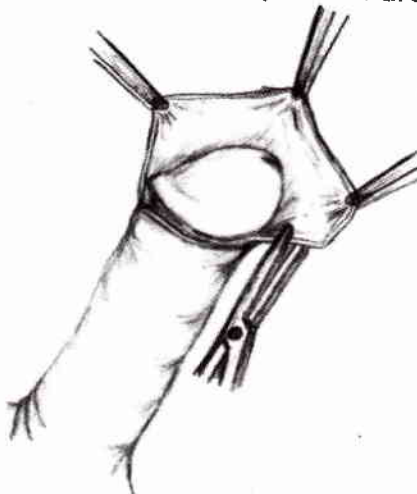
- a, b, c, d. as bone cutting method.
e- Hold the opening of the prepuce by 2 artery forceps.



- f- Cut the prepuce till sulcus of glans penis.

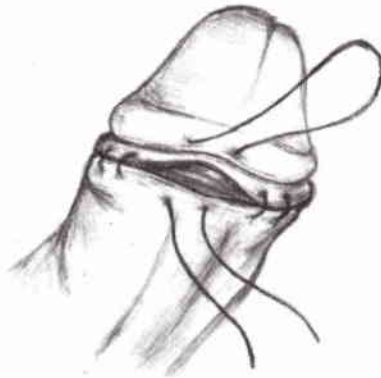


- g- Divide the prepuce all around.



- g-** Ligate the dorsal v. of the penis & frenal vessels (haemostasis)
Suture the skin to remnant of m.m. with 4 sutures.

(U-Shaped suture Is taken at the site of the phrenal vessel as shown in the diaphragm and is important site for the hemostasis)



h- As bone cutting method.

NB. *Paraphimosis* = Any constriction of the glans at the corona e.g.:



- 1- Prepuce (not in circumcised person).
- 2- Fibrosis.

➤ **References:**

- Brennae, Mark (June 13, 2007).
- Belly & love's 25th edition

possible oral questions

- 1- What is main contraindication of circumcision?
- 2- Why in hypospadias circumcision is contraindicated?
- 3- What is frenal artery?
- 4- What is phimosis?
- 5- What are the complications of phimosis?
- 6- What is plasibel (Hollister) method of circumcision?

Amputations

Indications:

1- Inflammatory:

- Gas gangrene.
- Diabetic gangrene.

2- Ischemia:

- Neglected acute ischemia.
- Chronic ischemia (e.g. atherosclerosis, Buerger's disease).

3- Tumor (Malignant):

- Of bones (e.g. osteosarcoma)
- Of soft tissues (e.g. infiltrating surrounding bone)

4- Traumatic:

- Extensive crush injuries.

5- Congenital deformity: (More in LL than in UL).

Methods of amputations:

A) Guillotine amputation: (Limb entrapped in machine)

- The most primitive method.
- All tissues are divided at the same level.

B) Circular amputation:

1. Skin & fascia are divided in circular fashion.
2. Muscles, vessels & nerves are divided at higher level than 1.
3. Bone is divided at higher level than 2.

C) Flap method:

- The most commonly used.
- Either equal antero-posterior flap or long post flap.
- The flap should be = 1 1/2 times to the circumference of the limb at the level of bone section.
- Each flap should be cut semicircular (to avoid dog ear).

d) Oval or elliptical method:

(As in Syme's amputation) page 113

- Upper end of the oval → at level of bone section.
- Lower end → equal diameter of length.

e) Racquet method:

- Straight incision is carried out from circular or elliptical one.
- Used for disarticulation of joints (fingers, toes or shoulder).

Characters of the ideal stump:

A- Appropriate length:

- Above knee 30 cm.
- Below knee 12 cm.

B- Painless.

C- Conical in shape: to allow fitting of prosthesis.

D- Has good muscular control.

Complications of amputations:

- 1- **Sloughing & ulceration of skin.**
- 2- **Hematoma & infection.**
- 3- **Osteomyelitis → ring sequestrum in 3 ms (TTT is higher amputation or sequestrectomy).**
- 4- **Bone protrusion (TTT is high amputation).**
- 5- **Phantom limb (may be painful).**
- 6- **Stump neuroma.**
- 7- **Adherent scar.**
- 8- **Die back → 2ry occlusion of B.Vs → stump gangrene.**

Above knee amputation

I- Indications: → see above.

II- Contraindications:

Gangrene or ischemia at level of amputation. هيمنع التام الجرح

III- Preoperative preparation:

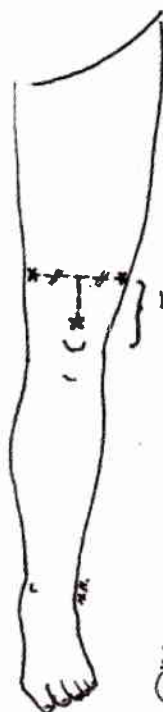
Access the viability of the skin flaps (no ischemia at that level).

IV- Anesthesia: → General / spinal anesthesia.

V- Steps:

1- Skin preparation: → From lower part of the abdomen to upper part of skin covering the tibia.

2- Incision:

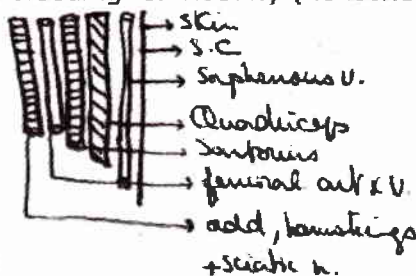


1. Mark the level of bone cutting with a marker (= a handbreadth above knee).
2. Encircle the thigh at that level with a thread (so the thread length represents the circumference of the limb at the level of bone cutting).
3. Cut the thread into 2 equal pieces (so each represent half the circumference of the limb at the level of bone cutting).
4. Fix one half of the thread at level of bone cutting by the use of 2 pins applied on both sides of the thigh.
5. The other half is re-divided into 2 pieces & this quarter is applied ant & post perpendicular to the middle of the half circle by 2 other pins.
6. Therefore 4 pins are applied to the thigh (1).
7. The incision is done along a thread passing through the 4 pins.
8. Therefore the incision equals 1.5 times as the circumference of the limb at the level of bone cutting.

3- Procedure:

①

1. Assess skin flaps bleeding for viability (no ischemia at this level) (2)



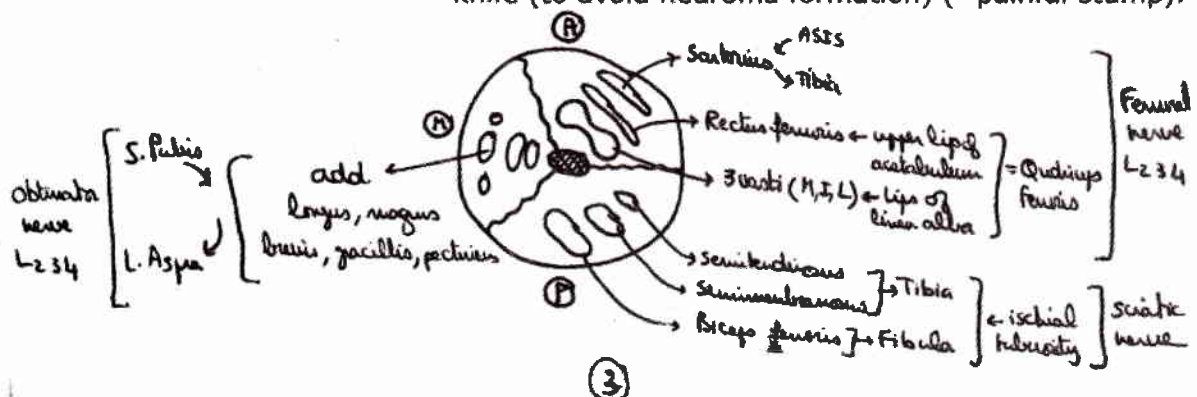
②

2. Ligate the long saphenous.

3. Deepen ant flaps through the quadriceps femoris to the femur & ligate all major muscular vessels
4. Cut the sartorius ms then ligate & divide the femoral art & v. separately
5. Divide the adductors (longus & magnus) then cut the sciatic n.

The sciatic nerve:

- Must be ligated (to avoid bleeding from the vasa nervosa)
- Must be cut as high as possible & with a very sharp knife (to avoid neuroma formation) (=painful stump).



6. Divide the Hamstrings (semimembranosus, semitendinosus & biceps femoris) posteriorly & ligate all bleeding muscular vessels (3).
7. Cut the periosteum & elevate it above the level of bone cutting (to avoid osteophytes formation) then cut the bone (femur).
Protect the muscle from bone fragment during sawing the bone by muscle guard (shield) to avoid formation of myositis ossificans).
8. Bone wax is applied if there is bleeding from bone marrow.

4- Closure:

1. Absolute haemostasis.
2. Put a drain for 48 hrs.
3. Myoplasty:
 - Suture adductors to vastus lateralis over the femoral stump loosely.
 - Suture superf. Quadriceps to hamstrings with loose absorbable sutures (e.g. chromic cat gut or vicryl).
 - Close deep fascia of ant & post flaps.

Below knee amputation

- Is the removal of the lower limb in which the bone division is performed a few centimeters distal to the tibial tuberosity.

• The difference between above & below knee amputation:

- 1- Long posterior flap.
- 2- Length of the stump should be at least 15 cm.
- 3- Cut the fibula before the tibia.
- 4- Cut the tibia lower than the fibula.
- 5- Bevealing of the tibia.
- 6- Flap has to be mucocutaneous flap with gastrocnemius.
- 7- We remove the soleus muscle because the flap has not to be bulky.

Syme's Amputation

I- Indications:

- 1- Is principally indicated for congenital foot deformities which can not be corrected to a plantigrade position
- 2- Severe injury to the foot, as long as the heel pad remains viable.
- 3- Vascular insufficiency, with or without diabetes, and infection of the forefoot.
- 4- Foot malignancies.

Contraindications:

- 1- Females (bad cosmesis).
- 2- Ischemic foot or presence of infection.
- 3- Bow leg.

II- Steps:

- **First stage:**
 - Ankle is disarticulated and the amputation is revised approximately 6 wks later
- **Second stage: includes**
 1. Resection of the malleoli in flush with joint surface.
 2. Fixation of the fat pad to residual bone.
 3. Revision of redundant skin.

III- Advantages compared to below - knee amputation:

- Below-knee amputations are often used as a substitute to the Syme's procedure, even though Syme's amputations have many important benefits as compared to below-knee amputations such as:
 1. The ability to bear weight without the prosthesis,
 2. Pts. are generally able to walk all day without skin irritations or damage to stump.
 3. Little shortening of the limb.

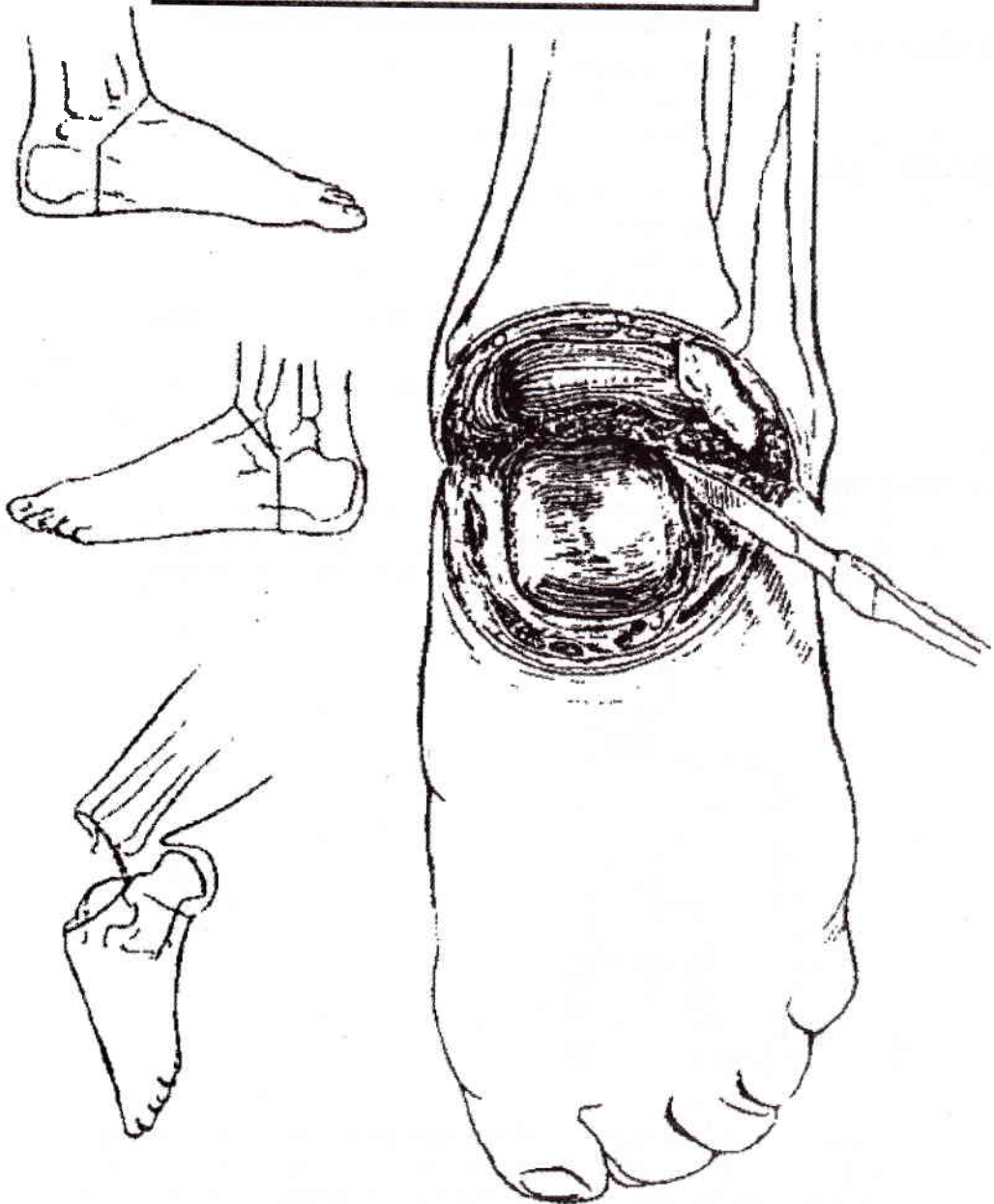
IV- Complications:

- 2- Drainage (dead space).
- 3- Suture dog ears.
- 4- Severing tibial artery.
- 5- Flap puncture (calcaneal dissection).
- 6- Transverse shift (loss of attachment).
- 7- Premature endloading.
- 8- Bad cosmesis
- 9- Skin ulceration.



NB Blood supply of the flap: Medial and lateral calcaneal branches.

Syme's amputation



possible oral questions

- 1- What is the difference between amputation and disarticulation?
- 2- What are the principles of selection of site of amputation?
- 3- What is phantom limb?
- 4- What are characters of ideal stump?
- 5- What is syme's amputation?
- 6- What are different methods of amputations?
- 7- What are complications of amputations?

Chest drain insertion

A-Indications:

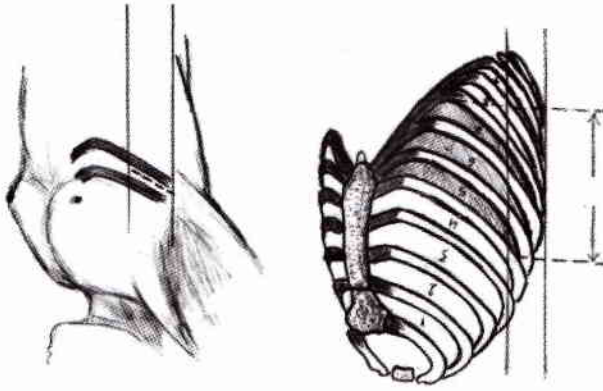
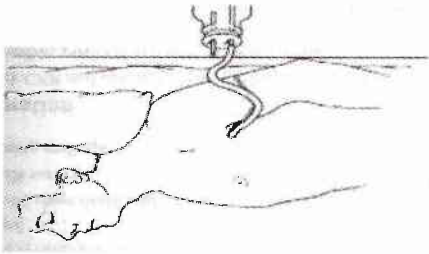
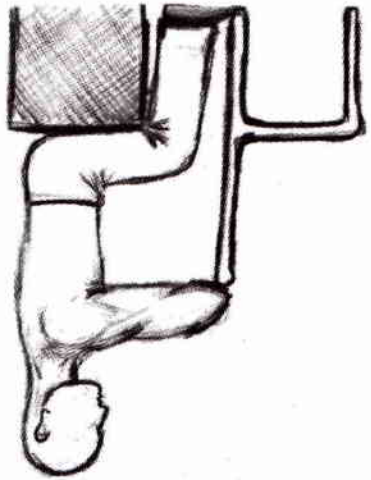
- Pneumothorax .
- Haemothorax.
- Post-thoracotomy.

II-Equipments:

- Dressing pack.
- Gloves.
- Antiseptic.
- Lignocaine.
- 10 ml syringe plus 21G and 25G needles.
- Scalpel.
- 29G chest drain and collecting set (underwater seal)
- 1 /0 silk suture.
- Dressing and tape.

III-Preparation:

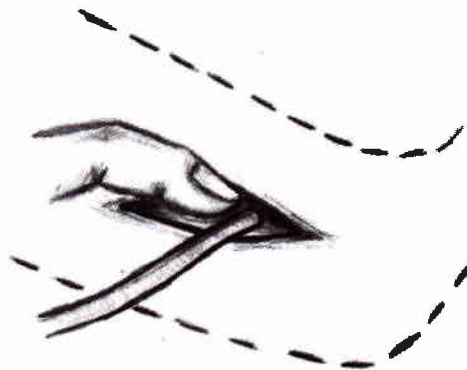
- Check CXR and confirm patient's clinical findings.
- If possible, Position the patient appropriately, sitting on a stool or the edge of the bed with arms folded over a bedside table is ideal.



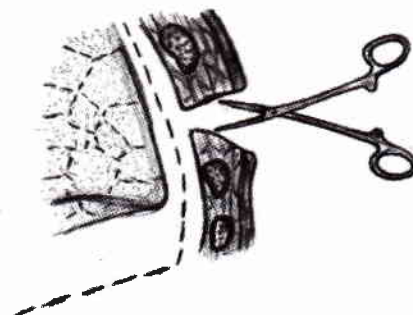
- Identify the appropriate intercostal space prior to starting.
- A point in the fifth to seventh intercostal spaces between the mid-axillary and anterior axillary lines is most appropriate for chest drain insertion.

IV:- Method

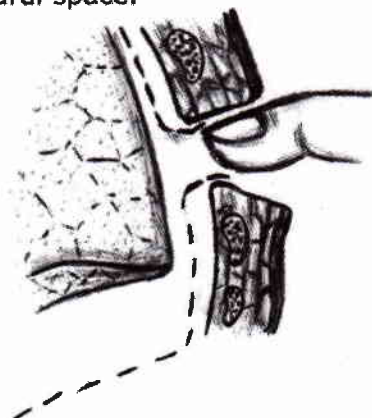
- Clean the area of proposed drain insertion thoroughly and place sterile drapes.
- Infiltrate the skin and subcutaneous tissue down to the pleura at the site of insertion with local anaesthetic.
- Make a 2-3 cm incision through the skin (large enough to accommodate your finger plus the drain) parallel to the ribs in the appropriate intercostal space and deepen the incision to muscle.



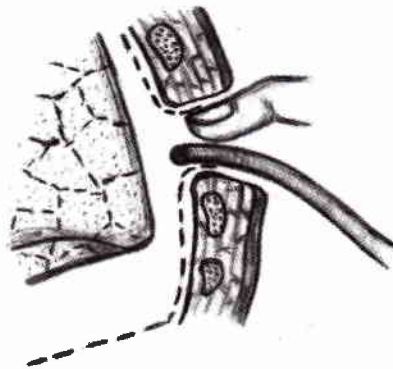
- Separate the muscle fibers apart with artery forceps to expose the pleura.

**1- Insertion of an intercostal drain**

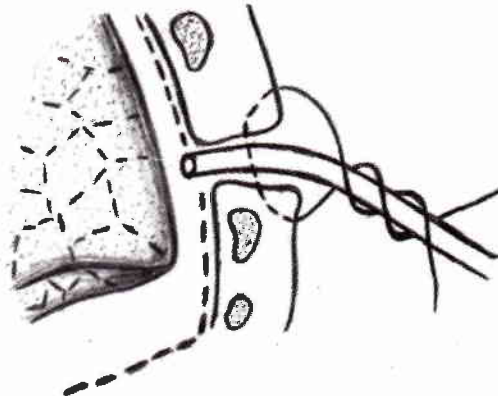
- Pierce the pleura with the artery forceps and introduce a finger to confirm entry to the pleural space.



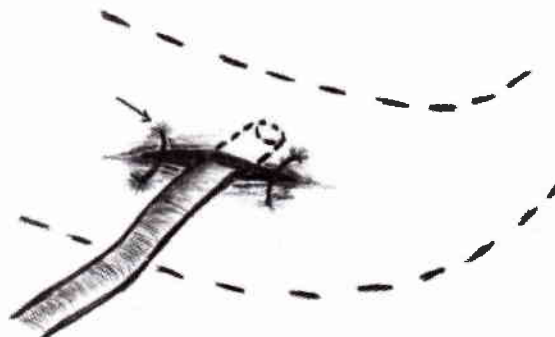
- With the guiding finger still in place, introduce the chest drain into the pleural space and direct into place.



- Place two loose sutures across the wound to allow easy closure when the drain is removed.



- Suture the drain in place with a suture placed through the skin and then tied multiple times around the drain itself. Apply a sterile, preferably translucent, dressing over the drain.



- Attach drain securely to underwater seal arrangement and ensure the fluid in the tube swings with respiration.
- Always obtain a CXR to confirm the position of the drain and the progress of the condition for which the drain was inserted.

2- Tips and problems

- Agitated or anxious patients: a small dose of IV opiate may help. Ensure the drain is well secured to the chest wall and the underwater seal tubing. This will hopefully avoid the drain becoming dislodged accidentally.
- Do not clamp the drain. This can be potentially dangerous. As long as care is taken to ensure that the underwater seal arrangement is kept below the level of the patient, there will not be a problem, even on transferring the patient.
- If there is no simple answer to the problem, then the tube will need to be replaced through a fresh incision.
- Persistent bubbling: there may be a broncho-pleural fistula. Ask for expert help.

3- Chest drain removal

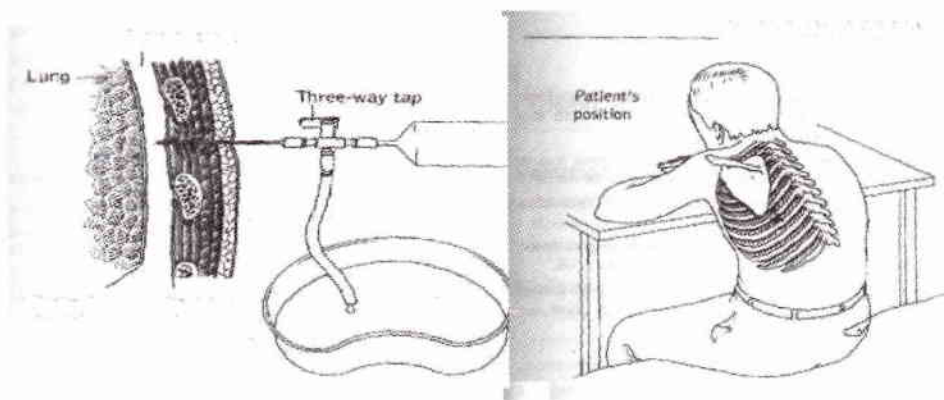
- Many patients find this procedure uncomfortable and use of an IV opiate often aids removal. A small number of patients may need light sedation, e.g. small dose IV midazolam (Note: Need for appropriate monitoring during sedation.).
- **Equipments:**
 - Gloves.
 - Forceps.
 - Gauze swabs.
 - Tape.
- **Method:**
 - Remove dressing and sutures holding drain in place.
 - Ask patient to hold breath in full inspiration as the drain is removed.
 - Close the wound by tying the two loose sutures

Pleural Aspiration**Indications:**

- Drainage of pleural effusion.
- Drainage of early empyema.

Equipments:

- Dressing pack.
- Pleural aspiration set.
- Gloves.
- Local anaesthetic.
- 60 ml syringe with lock and three-way tap.
- Iodine cleansing solution.



Preparation:

- Check CXR together with the patient's clinical findings.
- Position the patient appropriately, sitting on a stool or the edge of the bed with arms folded over a bedside table is ideal.
- Identify the appropriate intercostal space prior to starting procedure. A. point in the seventh intercostal space between the mid-axillary and posterior axillary lines is usually best.
- Ensure all equipments are present and functioning prior to starting.

Method:

- Clean a wide area of the chest around the aspiration site.
- Infiltrate the skin and subcutaneous tissues down to the pleura with lignocaine.
- Attach aspiration needle or cannula to the three-way tap and syringe which is attached to the drainage bag.
- Introduce the needle slowly (above the appropriate rib, as the neuromuscular bundle lies under it)
- For a diagnostic tap, remove approximately 20 ml of fluid for culture, and cytology.
- for a therapeutic tap, continue to aspirate until fluids no longer exists or you have removed up to 1.5 liters.
- Remove the needle and apply a dressing over the site.

Problems:

- **Diagnostic taps:** should be done early in the morning if possible as cytology specimens must be processed quickly. The cells may degenerate rapidly if left overnight.
- **Dry tap:** the effusion may be loculated or an empyema may be organized. Aspiration under ultrasound guidance maybe needed.
- **Pneumothorax:** can complicate the procedure. Obtain urgent chest X-ray. The patient may need a chest drain.
- **Very bloody tap:** an intercostal vessel may have been punctured. Keep the patient on regular observations and repeat the CXR.
- **Marking the proposed site:** a fingernail or five pence coin pressed firmly onto the skin prior to preparing the skin will allow easy identification once drains have been placed.

Sympathectomy

I- Indications

☐ *Where direct arterial surgery is not technically applicable i.e. cases of distal occlusions with no run-off.*

1. **Buerger's disease:** Vaso-occlusive disease → sympathectomy only improves collaterals
2. **Raynaud's disease:** Vaso-spastic disease → sympathectomy gives better results than in Buerger's.
3. **Other indications:**
 - a. **1-hyperhydrosis.**
 - b. **2-Causalgia.**
 - c. **3-Intractable upper abdominal pain.**
 - d. **4-Others: intractable angina.**

II- Contraindications

1. Atherosclerosis except with tissue loss → improve collaterals → improve healing (done in combination with direct arterial surgery).
2. Diabetics as the patient is already suffering from neuropathy → sympathectomy is of no use.
3. Contraindications for thoracoscopy:
 - a. Pleural adhesions.
 - b. Previous thoracotomy or intercostal tube.
 - c. Inability to tolerate one lung anaesthesia (COPD, contralateral pneumonectomy).

III- Types

1. Ischemia of UL → **Dorsal sympathectomy:**
 - T2,3,4 are transected.
 - T1 (or Stellate ganglion) is left to avoid Horner's syndrome.

Types:

- Open (supraclavicular - posterolateral - transaxillary)
- Thoracoscopic

Complications of dorsal sympathectomy:

- 1- Horner syndrome.
 - 2- Post sympathectomy neuralgia.
 - 3- Post sympathectomy compensatory sweating.
 - 4- Fantom limb.
 - 5- Gustatory sweating.
 - 6- Recurrence.
2. Ischemia of LL → **Lumbar sympathectomy**
 - L2,3,4 are transected .
 - L1 is left to avoid retrograde ejaculation.

IV- Disadvantage

- 1) **Redistribution of blood** → ↑ blood supply to skin & ↓ blood supply to muscles
→ claudication pain.
- 2) **Recurrence**: after few years due to hypersensitivity to circulating catecholamines
= denervation hypersensitivity

Bowel preparation**Mechanical preparation options:**

- 1- Dietary restriction: clear fluid for 1-3 days.
- 2- Cathartics: stimulate bowel evacuation.
- 3- Enemas: (Saline – soap – tap water)
- 4- Oral lavage:
 - a. Saline
 - b. Mannitol.
 - c. PEG (Polyethylene glycol)
- 5- Intraoperative lavage.

Antibiotic preparation:

- 6- Luminal antibiotic (Neomycin – Flagyl)
- 7- Prenteral antibiotic.

Right hemicolectomy

Aim: Removal of primary tumour and its draining lymph nodes.

Bowel preparation: see before.

Steps:

- 1- Midline incision.
- 2- Assessment of the tumour for resectability.
- 3- Exploration of the abdominal cavity.
- 4- The peritoneum lateral to the colon is incised and the incision is advanced around the hepatic flexure (White line).
- 5- The right colon is elevated with the peritoneum containing its vessels, lymph nodes from the posterior abdominal wall (take care not to injure 1- The ureter 2- Gonadal vessels 3- The duodenum)
- 6- Devascularization by ligation of ileocolic artery and right colic artery.
- 7- Structures removed are: Caecum, ascending colon, hepatic flexure, proximal 1/3 of transverse colon and the last 30 cm of ileum.
- 8- Anastomosis between ileum and transverse colon end to end.
- 9- Drain.
- 10- Closure in layers.

Anterior Resection

Bowel preparation: see before.

Position of the patient: lithotomy Trendelenburg's position.

Step:

- 1- Midline incision.
- 2- Exploration of abdominal cavity.
- 3- Initial incision of visceral peritoneum lateral to the left colon extending upward till splenic flexure and downward till the pelvis.
- 4- Ligation and division of inferior mesenteric vessels.
- 5- Mobilization of mesorectum, rectum and tumour.
- 6- Posterior dissection (Waldyer's fascia)
- 7- Lateral dissection.
- 8- Anterior dissection.
- 9- Anastomosis:
- 10- Hand sewen.
- 11- Stapler.
- 12- Defunctioning stoma.

Complications:

- 11- Anastomotic leakage.
- 12- Anastomotic stricture.
- 13- Local recurrence.

Colostomy

Definition: surgical opening in the colon to outside (the skin).

Indications:

Congenital

- 1) High anomalies imperforate anus.
- 2) Hirschsprung disease.

Acquired

1) Trauma:

- Rupture colon - rectum.
- Perineal burns, wounds.

2) Cancers:

- A.P resection of rectum.
- Inoperable cancer colon (left side), rectum or anus.

3) Inflammatory:

- High perineal fistula.

4) Colonic I.O. (left):

- e.g stricture - volvulus.



Types:

1) Terminal colostomy: = end colostomy

e.g. with A.P resection of the rectum

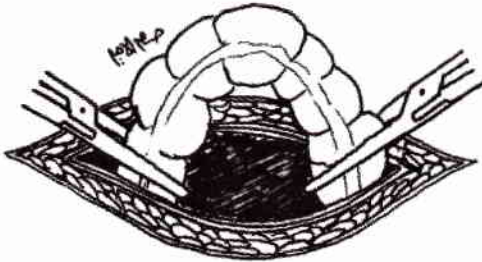
- The proximal cut end is exteriorized & sutured to the skin.
- The distal end is removed.

2) Simple loop colostomy:

Done in mobile (or mobilized colon).
e.g - sigmoid, - transverse (Rt side).

3) Double-barrel colostomy:**Other classification:**

- Permanent colostomy.
- Temporary colostomy.

4) Caecostomy: (open -tube).5) Appendicostomy.**Complications of colostomy:**

- (1) Obstruction of the opening. E.g fecal mass - skin stenosis - scarring - loop kink.
- (2) Retraction.
- (3) Prolapse.
- (4) Incisional paracolostomy hernia.
- (5) Internal hernia & may be strangulation via paracolic gutter.
- (6) Peritoneal soiling.

Gastrostomy

Definition:

- This is an insertion of a feeding tube into the stomach.

Description:

- This is often done through endoscopy (a long tube placed through the mouth into the stomach) by a gastroenterologist. Local anesthesia and intravenous sedation are used.
- It may also be done surgically. While the patient is deep asleep and pain-free (general anesthesia), a small incision is made on the left side of the abdomen. A small, flexible, hollow tube (catheter) with a balloon or flared tip is inserted into the stomach. The stomach is stitched closed around the tube and the incision is closed.

Indications:

- Gastrostomy tubes are inserted for various reasons. They may be needed **temporarily** or **permanently**. Gastrostomy tube insertion may be recommended for:
 - Birth defects of the mouth, esophagus, or stomach (esophageal atresia or tracheal esophageal fistula).
 - Patients who cannot swallow correctly.
 - Malnourished patients who cannot take enough food by mouth to maintain their nutrition.
 - Patients who continually aspirate when eating.

Risks:

- Risks for any anesthesia are:
 - Reactions to medications.
 - Problems breathing.
- Risks for surgical or endoscopic feeding tube insertion are:
 - Bleeding.
 - Infection.

Expectations after surgery:

- This is a relatively simple surgery with a good prognosis.

Convalescence:

- The stomach and abdomen will heal in **5 to 7 days**. Moderate pain can be managed with medications.
- Feedings will start slowly with clear liquids and gradually be ↑.

The patient/family will be taught:

- How to care for the skin around the tube.
- Signs and symptoms of infection.
- What to do if the tube is pulled out.
- Signs and symptoms of tube blockage.
- How to empty (decompress) the stomach through the tube.
- How and what to feed through the gastrostomy tube.
- How to conceal the tube under clothing.
- What normal activities can be continued.

Tracheostomy

Definition:

- A tracheostomy is an opening surgically created through the neck into the trachea (windpipe). A tube is usually placed through this opening to provide an airway, and to remove secretions from the lungs. This tube is called a tracheostomy tube or trach tube.

Description:

- I. Anaesthesia: general, in absence of upper respiratory obstruction.
- II. Position: supine.
- III. Incision:
 - Vertical midline or horizontal incision.
- IV. Steps:
 - Cut platysma, superficial fascia & deep fascia.
 - Incise the trachea & insert tracheostomy tube.

Types

- High tracheostomy (in 1st & 2nd tracheal rings).
- Mid-tracheostomy (in 3rd & 4th tracheal rings).
- Low tracheostomy (in 5th & 6th tracheal rings).

N.B: Mid tracheostomy is the operation of choice.

Indications:

- **A tracheostomy may be performed because of:**
 - An inherited abnormality of the larynx or trachea.
 - Severe neck or mouth injuries.
 - Breathing corrosive material smoke or steam.
 - A large object blocking the airway.
 - Paralysis of the muscles that affect swallowing.
 - Long-term unconsciousness or coma.

Risks:

- The risks for any anesthesia are:
 - Reactions to medications.
 - Problems breathing.
- The risks for any surgery are:
 - Bleeding.
 - Infection
- Additional risks include:
 - Erosion of the trachea (rare)
 - Scar tissue in the trachea

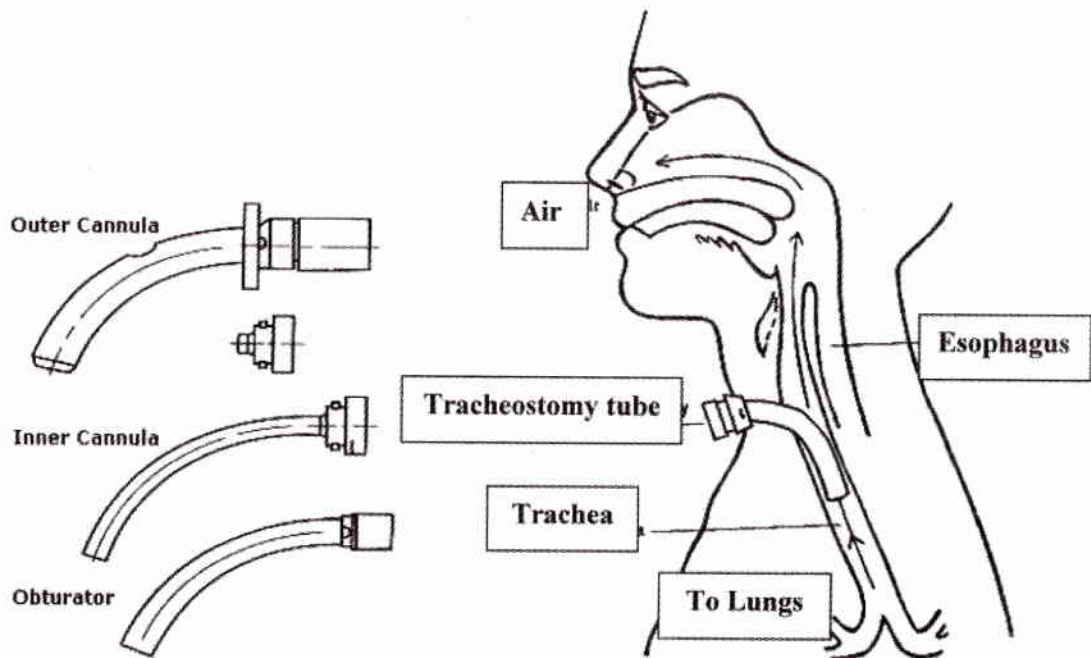
Expectations after surgery:

- **In temporary tracheostomy**, the tube will eventually be removed. Healing will occur quickly, leaving a minimal scar.
- **In permanent tracheostomy**, the hole remains open and may require surgical closure when no longer needed.

Post operative care:

- **Position**: semisetting.
- **Humidification**: by steam inhalation.
- **Antibiotic**: to avoid 2ry infection.
- **Observation of**: bleeding & respiration.
- **Bronchial toilet**: repeated suction of bronchial secretion.

- **Tube toilet.**
- **Extubation:** when the patient can live with tube corked for 1-2 days (weaning)



Submandibular Sialoadenectomy

Indications:

- Chronic sialoadenitis.
- Stone gland (or recurrent stone duct).
- Part of other op. as commando's operation.

Anaesthesia: General.

Position:

- 1- The patient lies in supine position.
- 2- The neck is extended.
- 3- The head turned away from the surgeon.

Incision:

- Starts near mid line till angle of mandible 3 cm below ramus in upper skin crease, infiltration with lidocaine & epinephrine around the incision.
- Divide skin, S.C, Platysma in the same line & reflect flaps (to avoid cervical branch of facial).

Steps:

- 1- Ligate facial vein on the superficial surface of the gland.
- 2- Ligate Facial artery on post. border as it enter the gland then ligate it again when it comes anterior from the gland.

- 3- Freeing superficial lobe from mylohyoid → deliver deep lobe & dissect & avoid injury
o lingual n. above & Hypoglossal n. below.
- 4- Double ligation & division of duct.
- 5- Close in layers with S.C drain.

Complications:

- As usual + injury of:
 - 1- Cervical branch of VII.
 - 2- XII.
 - 3- Lingual nerve.
- Injury of lateral pharyngeal wall.

Superficial Conservative Parotidectomy**Indications:**

- 1- Benign tumour of superficial lobe.
- 2- Recurrent attacks of inflammation.
- 3- Multiple stones of the gland.
- 4- Intractable parotid glandular fistula.

Pre operative preparation:

- 1- Shaving
- 2- Consent: Possibility of facial nerve injury.

Position: as submandibular gland.

Anesthesia: hypotensive anesthesia (Avoid muscle relaxation).

Incision: Y-incision.

Steps:

- 1- skin flap is raised in the plane of preparotid fascia till the anterior border of the gland. Posteriorly till sternomastoid muscle.
- 2- Identification of facial nerve:
 - a. Identification of the trunk: after exit from stylomastoid foramen and before entering the gland.
 - b. Identification of mandibular branch: at the lower border of the gland accompanied by retromandibular vein.
 - c. Buccal branch: runs along parotid duct.
- 3- Once the facial nerve is identified, the superficial lobe of the gland can be exteriorized by opening the plane superficial to the nerve.
- 4- In deep conservative parotidectomy: the branches of the facial nerve are mobilized and lifted on a nylon tape to enable the deep lobe to be freed.
- 5- Blood pressure is returned to normal, and bleeding points controlled.
- 6- Drain.
- 7- Closure of subcutaneous tissue and skin.

Complications:

- 1- Neurapraxia.
- 2- Anesthesia of ear lobule due to injury of great auricular nerve.
- 3- Gustatory sweating = Frey's syndrome.
- 4- Salivary fistula.
- 5- Hemorrhage.
- 6- Recurrence.

Vascular exposure

Indications:

- 1- To control hemorrhage or repair injury.
- 2- To ligate or perfuse cytotoxic.
- 3- Before removing organ e.g. spleen.
- 4- To treat ischemia → e.g. embolectomy.

1- Exploration of common carotid artery:

- Patient lies supine, face turned to opposite side.

Incision:

- On ant. border of Sternomastoid at level of cricoid cartilage (in skin crease).
- Open skin - S.C- platysma & retract Sternomastoid back & omohyoid down → open carotid sheath (preserve ansa cervicalis).

2- External carotid artery:**Position & incision:**

- On anterior border of sternomastoid but at level of upper border of thyroid cartilage.
- Open skin - S.C. tissue - platysma & ligate ext. jugular & facial veins.
- Retract epigastric m. up & retract XII.

3- Subclavian artery:

- As sympathectomy

Incision: above clavicle (8 cm in length).

- Open skin, S.C. tissue, platysma & deep fascia.
- Divide clavicular head of Sternomastoid & scalenus ant. retract phrenic n. → expose artery & brachial plexus.
- Push Sibson fascia down → sympathectomy.

4- Brachial artery:**Middle part:**

Position: Forearm over side table.

Incision: on middle aspect of Biceps.

Dissect artery with vena comitants from median n.

Terminal part:

Transverse incision in skin crease of cubital fossa medial to Biceps tendon & divide Bicipital aponeurosis.

5- External iliac artery:**Incision:** 2cm above lateral 1/2 of inguinal Ligament:

- Open inguinal canal → retract cord up.
- Divide fascia transversalis lat. TI internal ring → peel peritoneum up → you will see it.

6- Popliteal artery:**Upper part:** رجل المريض مثنية زاوية قائمة

Incision: → lower 1/3 thigh parallel to adductor magnus.

Retract → adductor magnus → forward.

→ sartorius & semi-membranosus → back.

Lower part: patient is prone

- Incision between the 2 heads of gastrocnemius vertically = follow short saphenous to popliteal vein & retract vein & tibial n. & dissect fascia till popliteal artery

Rib Resection

Indications:

- 1- Rib disease (T.B, Tumors...) or cervical rib.
- 2- Cardiothoracic operations.
- 3- Abdominal operations e.g Subphrenic abscess.

Types:

A- Intra-periosteal (resected within its periosteum):

- In rib disease & cervical rib.

B- Extra-periosteal:

- 1- H-shaped incision of ant. periosteal & elevate by periosteum elevator.
- 2- Dissect post. periosteum by rib raspatory (from below).
- 3- Divide the rib by rib shear.

Swellings

Lipoma:

- Incise skin (crease).
- Open S.C tissue & false capsule.
- Enucleate (finger) in the plane of cleavage & ligate feeding vessel.
- Close with or without drain.

Sebaceous cyst:

- Transverse ellipse including punctum dissect (blunt & sharp) & remove it
- **In scalp** → avulsion.

Venous Cut Down

Indication: in difficult cannulation in shocked patient.

Site: Done on any vein e.g great saphenous.

Cephalic – basilic are the most common.

Procedure on great saphenous vein:

- Open skin & S.C tissue over medial malleolus → ligate distally → put & fix cannula proximally

Hydrocele

Anaesthesia:

- General anesthesia or spinal.

Position: supine.

Steps:

- 1- Grasp scrotum & make Hydrocele tense.
- 2- Antero lateral transverse incision.
- 3- Open skin, S.C & dartos muscle.
- 4- Dissect coverings (ext. spermatic fascia - cremastic m. & internal spermatic fascia)
- 5- Deliver hydrocele sac & open it anteriorly.

A- If tunica is thick & calcified:**Subtotal excision:**

→ Excise tunica near its reflexion at Epididymis & cauterize the edge (or continuous suture) for hemostasis.

B- If tunica is thin & healthy:**1- Eversion: (Jaboulay operation)**

Tunica is everted & sutured behind epididymis so any fluid → absorbed by scrotal lymphatics.

2- Plicaton: (Lord's operation): about 5 plicating sutures.

- 6- Replace with testis & close with drain.

Complications:

- A- Operative: non.
- B- Post-operative: hematoma - infection.
Rrecurrence → especially after eversion.

NB: tapping is not used as it may lead to haematocele, pyocele or recurrence

Varicocele

Indications:

- 1- Failure of medical treatment (severe symptoms that can not be tolerated)
- 2- Complications:
 - a- Subfertility.
 - b- Recurrent thrombophlebitis.
 - c- Failure of medical commission.
 - d- Neurotic patient.

Types:**A. Microscopic sub-inguinal approach (Mark Goldstein):**

- The most commonly used approach.

❖ Steps:

- Anterolateral incision in the scrotum.
- The testis is delivered to isolate and divide gubernacular and external spermatic veins.
- After testis is returned to the scrotum, spermatic cord is elevated with ligation of dilated internal spermatic veins (under operating microscope).

❖ Advantages:

- Direct approach to spermatic cord.
- Small incision.
- Less postoperative pain as there is no incision of apponeurosis.

B. Inguinal approach (Modified Ivanissevish and Gregorini):❖ **Steps:**

- Inguinal incision 5-10 cm.
- The spermatic cord is exposed and dissected.
- All dilated internal spermatic veins are ligated.
- The cord is elevated with ligation of external spermatic veins (running parallel to spermatic cord).

❖ **Advantages:**

- Low incidence of varicocele recurrence.

❖ **Disadvantages**

- Hydrocele formation (7%).
- It weakens the inguinal canal and may lead to inguinal hernia.
- Testicular artery injury.

C. Retroperitoneal approach (Palomo):❖ **Steps:**

- Incision at the level of internal inguinal ring
- Splitting of muscles of anterior abdominal wall
- Exposure and ligation of internal spermatic vein retroperitoneally near the ureter

❖ **Advantages:**

- Testicular artery has not yet branches at this level, and is distinctly separated from internal spermatic vein
- Isolating the internal spermatic vein at the level where only one or two large veins are present.

❖ **Disadvantages:**

- High incidence of recurrence due to presence of collateral vessel that may bypass area of ligation.
- Injury of testicular artery and lymphatic (as they can not be delivered into the wound at this level)

N.B. What is embolization of varicocele?

N.B. What are the causes of recurrent varicocele?

- 1- In many cases dilated vessels due to cremasteric vein defect.
- 2- If bilateral varicocele, if we treat one side as both sides are communicating.

Undescended Testis

Indications: At the age of 1 year → in unilateral cases
→ bilateral with failed hormonal TTT

Incision: Inguinal incision.

Steps:

- Dissect testis & cord.
- Herniotomy for associated hernia.
- We can ligate & divide anything in the canal except vas & its vessels:
 - Cord coverings.
 - Pampiniform plexus.
 - Testicular artery.
 - Inferior epigastric artery.
- Introduce index finger in internal ring & dissect vas & vessels in the retro-peritoneum
- If the testis is not reaching the scrotum → (Fowler-Stephen): testis is mobilized on a pedicle containing ves & its artery.
- Microvascular anastomosis between distal end of testicular artery & inferior epigastric artery.

Orchiopexy:

- Bevan.
- Benson (pouch).

N.B: If patient is adult with testicular atrophy → orchietomy

Prostatectomy

1- Supra-pubic transvesical (Freyer's):**2- Steps:**

- Incise bladder mucosa over the adenoma by cautery (to facilitate enucleation).
- Put index finger in the internal meatus & push anteriorly → till reaching the plane between adenoma & surgical capsule → dissect circumferentially removing the adenoma.
- Remove V-shaped wedge from the post. margin of U.B.
- Control bleeding from bed Harries transfixing stitches (boomerang needle) cover by mucosa of post. lip of meatus to urethral mucosa).
- Remove the shelf of the bed (or excise the shelf).
- Inflate 3-way Foley's catheter in the bed.
- Close bladder 2 layers.
- Drain the cave of retzius.
- Ligate Vas bilaterally (or not) to avoid post. op. epididymorchitis.
- Wash bladder with (glycine) post. operatively (NOT saline).

3- Retropubic prostatectomy: (Millen's):**4- Perineal prostatectomy:****Not done as causes:**

- Perineal urinary fistula.
- Injury of external urethral sphincter.

Complications of prostatectomy:**1- Operative:**

- 1ry Hge (control bleeding).
- Injuries:
 - Membranous urethral (retropubic).
 - Sphincter (TURP).

Incontinence.

2- Post-operative:**a- Reactionary Hge :**

(TTT of blood transfusion + wash + pull on Foley's → if failed → re-exploration & secure).

b- 2ry Hge: (TTT antibiotics) + a**c- Sterility:** (due to retrograde ejaculation).**d- Stricture urethra** (TTT is dilatation).**e- Suprapubic fistula** (Stricture – shelf).**f- Infection** (bladder – bed – epididymorchitis).**g- Osteitis pubis:**

- Occurs 3 weeks later due to infection in the cave or trauma to the periostium → waddling gait & tender pubis.
- X-ray: wide symphysis + osteoprosis.
- TTT:
 - Corticosteroids.
 - Incision (posteriorly) → curettage & dilatation → antibiotic beads.

How to drain abscess

A. Pyogenic abscess:

- There are two techniques:

Closed technique:

- Deep abscess can be treated by ultrasound or CT guided aspiration.
- Success can not always be guaranteed.
- Multiloculated abscesses may not drain adequately.
- Percutaneous access may be difficult because of the position of adjacent organs.

Open technique:

1- Incision → generous (good adequate length).

→ Dependant.

→ Along skin crease.

→ Parallel to major nerves or vessels.

2- The cavity is explored & open all loculi by finger

3- Packing by gauze (24 hrs)

- Haemostatic.

- Drainage.

Or put a drain (48 - 72 hrs).

4- Hilton's Method:

- Used in important places where there is important structures (nerves, vessels) that may be injured e.g axilla, neck, carotid etc...

Steps:

1- Incise skin & fascia.

2- Introduce a closed sinus forceps & open it inside in the direction of nerves & Vs & withdraw it open.

3- Repeat.

Examples:

1- Parotid abscess:

Blair's incision:

- Vertical incision from ear lobule to angle of mandible → transverse incision in the fascia to avoid facial nerve injury → use Hilton's method.
- Close with drain.

2- Breast abscess:

a- Circum-areolar incision:

- If the abscess is small & near the areola.

b- Radial incision:

- Not reaching the areola to avoid injury of major milk ducts → milk fistula

c- Gillard Thomas:

- In retro-mammary abscess.
- Counter-incision: May be needed in the lower part of the breast in case of independent abscess & drain is passed through it.

3- Perineal abscess:

Ischiorectal abscess:

- General anesthesia → Lithotomy.
- Cruciate incision & trimming of the edges.
- Evacuate → finger breaking of septa, and if pus > 20 cc. → expect supralelevator. (pelvic abscess → open the levator with sinus forceps to evacuate it).

Perianal abscess:

General anesthesia → Lithotomy → cruciate incision, trimming of the edge.

Submucous abscess → proctoscope & diathermy knife.

4- Others:

- **Neck:** transverse parallel to skin crease.
- **Axilla:** vertical (gap on adduction).
- **Fore hand:** transverse (crease).
- **Cheek:** semilunar.
- **Cubital & pop. Fossa:** transverse.
- **Gluteal abscess:**

With direction of gluteus maxims fibers i.e. downwards forwards & laterally.

NB . Abscess where we do not wait for fluctuation: in important areas

- a. Parotid.
- b. Breast.
- c. Pulp.
- d. Peri-anal.

B. Cold abscess:

- Anti-T.B drugs.
- The rule is aspiration (not drainage).

a- Aspiration:

- Independent site.
- Healthy skin area.
- Enter zigzag way.
- Complete aspiration.
- Inject streptomycin.
- Repeat it.

b- Drainage:

In 2 conditions:

- 2ry pyogenic infection.
- Impending rupture.
- Open in independent area → wall is curetted well → dust with streptomycin → close without drain.

Surgical Drains

Drains:

- **Classification:**
 - Open.
 - Closed.
 - Active.
 - Passive.
- **Uses:**
 - Withdrawal of fluids.
 - Apposition of tissues to remove potential space by suction.
- **Types:**
 - Corrugated drain:
 - Safety pin on skin.
 - Shorten everyday.
 - Doesn't get lost.
 - Open passive drain:
 - Simple pack "gauze dressing"
 - Abscess.
 - Closed passive:
 - Robertson's.
 - Similar to T-tube

- Closed Active
 - J-Vac (mastectomy) (e.g. thyroidectomy)
 - Closed suction system [Tube + bag + suction]
- Open active
 - Suction in peritoneum
 - Pump

Drains are inserted to:

- Evacuate establish collections of pus, blood or other fluids
- Drain potential collections

Advantages:

- Drainage of fluid removes potential sources of infection
- Drains guard against further fluid collections
- allow the early detection of anastomotic leaks or haemorrhage
- Leave a tract for potential collections to drain following removal

Disadvantage:

- Presence of a drain increases the risk of infection
- Damage may be caused by mechanical pressure or suction
- Drains may induce an anastomotic leak
- Most abdominal drains became infective within 24 hours

Tubes and Drains**NG tube:**

- Decompression:
 - Remove gas at top of stomach
- Long term feeding:
 - 1 week/1 month
 - Silicon narrower and softer
 - Complex carbs/proteins/polypeptides
- Used for acute poisoning
- Made of PVC or Latex (note – fibrosis in latex)
- 45 cm long (Esophagus → 25 cm long)
- Indications:
 - Decompress stomach
 - Prevent aspiration
 - Long term feeding
 - Poisoning
- Contra-indications: basal skull fracture
- Complications:
 - Pressure necrosis → anosmia
 - Aspiration pneumonia/atelectasis
 - Sinusitis
 - Minor upper GIT bleed
 - Epistaxis
 - Pharyngeal irritation
- How to insert one:
 - Explain procedure to the patient
 - Measure from tip of nose around the ear lobes to xiphoid
 - Prepare equipment – sterile, lubricant gel etc
 - Ask patient to swallow as passing tube down (ice chips/water)
 - Gentle and firm continuous pressure
 - Confirm placement by
 - Aspiration of contents
 - Inject air and listen for sound with stethoscope
 - Low chest x-ray

Orogastric tube:

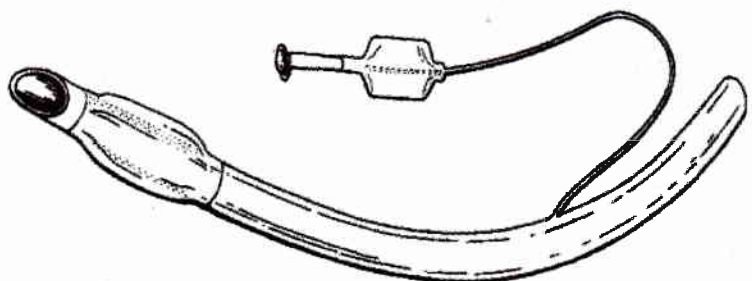
- Poisoning
- Massive upper GI bleed
- Basal skull fracture

Foley Catheter:

- Uses:
 - Drain bladder in acute retention
 - Monitor output
 - Bladder surgery
 - Pelvic surgery e.g. C-section
 - Empty bladder before surgery
- Self-retaining
- 2 channels or 3 channels
- Balloon
- Side arm and valve mechanism ensures balloon stays inflated
- 3-way is wider and harder
 - Can't be left in too long
 - Used for continuous irrigation of bladder in hematuria
- Materials:
 - Latex: change in 3 weeks
 - Silicone: 3 months
 - PVC: intermittent self catheterization
- Complications:
 - UTI's
 - Prevented by
 - Continuous drainage
 - Avoiding stasis
 - Drink a lot of fluids
 - Change regularly
 - Strictures
 - Stone formation
 - Reduced sphincter tone
 - Paraphimosis
 - Blockage
 - By-passing

Endotracheal tube:

- Clear/transparent
- Cuffed/uncuffed
 - Cuffed
 - Aspiration protection.
 - Adults
 - Uncuffed → children.
- Size → internal/outer.
- Graded.
- Radio-opaque line.
- One use only.
- Other types:
 - Double lumen.
 - Reinforced.
 - Laser.



Cuffed endotracheal tube

Laparoscopic surgery

It can be called minimal access surgery that can be categorized as follows:-

- 1. Laparoscopy**
A rigid endoscope is introduced through metal sleeve into peritoneal cavity, which has been inflated by CO₂ to produce pneumoperitoneum
- 2. Thoracoscopy**
A rigid endoscope is introduced through an incision in chest without inflation
- 3. endoluminal endoscopy**
Flexible or rigid endoscope is introduced into hollow organ
- 4. perivisceral endoscopy**
Endoscope is introduced even in absence of natural cavity to visualize body planes as retroperitoneoscopy
- 5. Arthroscopy & intra-articular joint**
Endoscope is introduced to the joint e.g. knee, shoulder, hip

Advantage & disadvantage of laparoscopic surgery

Advantage	Disadvantage
1. Decrease in wound size & pain	1. Loss of tactile feedback
2. Reduce wound infection, bleeding, dehiscence, herniation & nerve interruption	2. Dependence on hand-eye coordination
3. Improve morbidity & mortality	3. Difficulty with haemostasis
4. Improve vision	4. reliance on remote vision & operating
5. Decrease wound trauma & heat loss	

Preoperative preparation of laparoscopic surgery.

1. Overall fitness.
2. Patient is fully informed & consented.
3. Normal coagulation.
4. Thromboprophylaxis .
5. Evaluation if there are any previous operation or not .

Difficulty during laparoscopic operations

1. Previous abdominal surgery
2. Obesity
3. Bleeding (may need laparotomy)
4. Hepatosplenomegaly, Ascetics , Pregnancy

Postoperative care

1. most common routine postoperative symptoms are
2. Dull upper abdominal pain & shoulder pain → Simple analgesics
3. Nausea → antiemetic e.g. ondansetron
4. orogastric tube → if there is stomach distention & should be removed as soon as operation is over
5. Oral feeding start 4-6 h after surgery
6. Urinary catheter → removed once the patient is retain his consciousness
7. Discharge from hospital after 24h as long as patient feeling comfort & eat
8. Remove skin sutures after 48h
9. Mobility & convalescence

► References:

- B. & L. → P. 107.
- Principles of Surgery for MRCS, P.92

Principle of common laparoscopic procurers**Laposcopic cholecystectomy
"Lapchole"**

- ✓ It is become the treatment of choice for gall bladder stones
- ✓ it is contraindicated in pregnancy

preoperative preparation

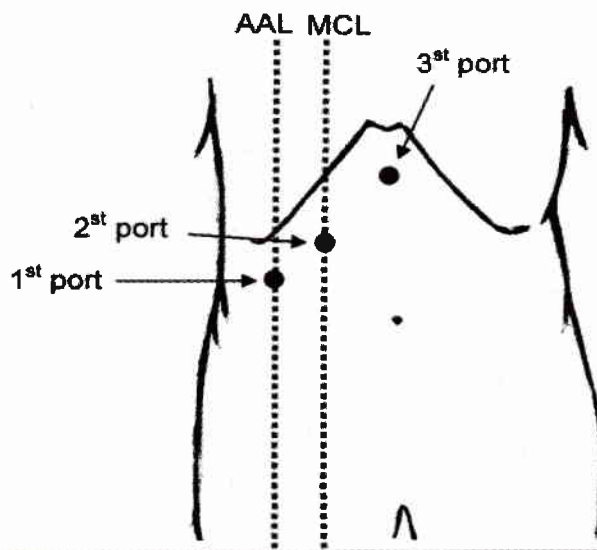
1. Patient is put in trendelenburg position "for cephalic traction of gall bladder"
2. Crepe bandage in lower limb to avoid DVT
3. Patient is catheterized

Steps

1. Apply verres needle below the umbilicus
2. Insufflate the abdomen by CO₂ "14 mmHg"
3. Introduce the trocar & Cannula then leave the cannula .
4. Introduce the camera from port below the umbilicus to inspect the whole abdomen
5. put the patient in anti trendelenburg position & change the direction of camera towards liver
6. Introduce other 3 ports
 - 1st → 2 finger breadth below costal margin in right anterior axillary line
 - 2nd → 2 finger breadth below the costal margin in midclavicular line for grasping the hartman's pouch
 - 3rd → 2 finger breadth below the xiphisternum for operating port
7. Perform as open cholecystectomy

Advantage

1. Better cosmetically
2. Short stay In hospital
3. Magnification
4. less post operative pain

**References:**

- B. & L. → P. 113.

Laparoscopic inguinal hernia

➤ It is indicated in multiple & recurrent hernia

Types of laparoscopic hernia repair

1. Trans abdominal pre-peritoneal repair (TAPP)
 - Abdominal inflated under GA with CO₂
 - Peritoneum incised above the hernia
 - prosthetic mesh stapled over the defect
 - Peritoneum is opposed over the mesh by use of stapling device
2. Extra-peritoneal Repair
 - Surgical balloons are inflated in the extra peritoneal space instead of entering abdominal cavity.
 - Endoscopic trocars & instrument are placed in operating tunnel
 - Stapled prosthetic mesh is used for repair

► References:

- B. & L. → P. 114.

Laparoscopic antireflux surgery

Advantage over the open surgery

1. The incidence of operative & postoperative complication is low
2. Reduction in hospital stay
3. Reduction in wound complication
4. Earlier return to normal activities

➤ There is no reason to expect better symptomatic results than the open one

Techniques.... I

Nissen fundoplication

1. Access is achieved via 5 port arrangement with surgeon standing to the left, right or between the legs of the patient, depending on preference
2. Mobilization of the esophagus is underway
3. Liver should be adequately retracted

➤ Rossetti Modification

It involves using just the anterior fundus to perform the wrap reducing the amount of gastro-esophagus dissection needed & making division of the short gastric vessels unnecessary

4. The wrap is secured with four or five silk sutures that may be tied intra-corporal or extra-corporal technique
- Nissen didn't consider closure of the hiatus by bringing the crura together behind the esophagus

Intraoperative complications:-

- | | |
|------------------------------------|-----------------------------------|
| 1. Unrecognized pleural laceration | 3. Gastric perforation |
| 2. Hepatic laceration | 4. wrap necrosis with perforation |

Post operative side effects :-

- | | |
|--|----------------|
| 1. Early satiety (The commoner) | 4. Nausea |
| 2. Hyperflatulence | 5. Odynophagia |
| 3. Diarrhea | |
| 6. postoperative dysphagia (which can be low incidence by entrancement of liquid 3weeks after surgery) | |

► References:

- B. & L. → P. 115.

Laparoscopic Appendectomy

- Mostly indicated as diagnostic tool in suspected appendicitis in women of child-bearing age

Steps

- Patient is positional in a moderate trendelenburg tilt to deliver loops of SI from pelvis
- Creating pneumoperitoneum with open is safer than closed one with veress needle
- After placing of operating ports, appendix is found by identifying the caecal taenia
- Controlling & elevation of appendix with laparoscopic forceps to displace the mesoappendix
- A window in the meso-appendix is created to allow ligation or coagulation of appendicular vessels
- Ligation of the base of appendix with absorbable loop ligature
- Dividing & remove the appendix through operating ports
- Single absorbable suture used to close linea alba at the umbilicus , subcuticular suture for skin incision

► References:

- B. & L. → P. 124.

Laparoscopic incisions

